

TOSHIBA

FILE NO. A03-006

SERVICE MANUAL

<OWNER'S MANUAL/INSTALLATION MANUAL>

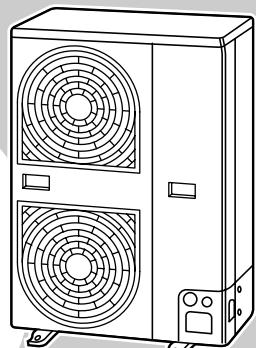
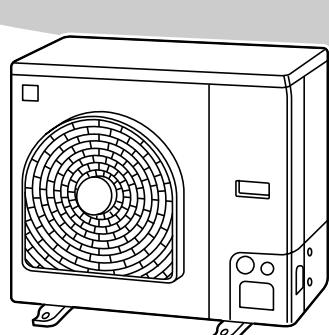
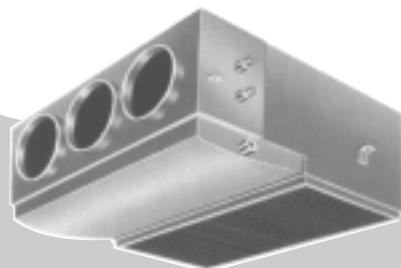
AIR-CONDITIONER SPLIT TYPE

RAV-SM561BT-E/RAV-SM560AT-E

RAV-SM801BT-E/RAV-SM800AT-E

RAV-SM1101BT-E/RAV-SM1100AT-E

RAV-SM1401BT-E/RAV-SM1400AT-E



ADOPTION OF NEW REFRIGERANT

This Air Conditioner is a new type which adopts a new refrigerant HFC (R410A) instead of the conventional refrigerant R22 in order to prevent destruction of the ozone layer.

WARNING

Cleaning of the air filter and other parts of the air filter involves dangerous work in high places, so be sure to have a service person do it. Do not attempt it yourself. The cleaning diagram for the air filter is there for the service person, and not for the customer.

Outdoor Unit

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RAV-SM560AT-E
RAV-SM800AT-E

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RAV-SM1100AT-E
RAV-SM1400AT-E

Indoor Unit

RAV-SM561BT-E/RAV-SM801BT-E/RAV-SM1101BT-E/RAV-SM1401BT-E

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ACCESSORIES

Accessories

OWNER'S MANUAL

WEEKLY TIMER FOR AIR CONDITIONER (SPLIT TYPE)

<Program Weekly Timer Type> RBC-EXW21E	72
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REMOTE CONTROLLER FOR AIR CONDITIONER

<Simple Operation Type> RBC-AS21E	78
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Standard Remote Controller	81
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Zeolite-3G Deodorant Filter	85
High-Efficiency Filter	86
High-Efficiency filter (65%) TCB-UFM11BE/TCB-UFM21BE/TCB-UFM31BE/TCB-UFM41BE	
High-Efficiency filter (90%) TCB-UHF51BE/TCB-UHF61BE/TCB-UHF71BE/TCB-UHF81BE	
Deodorant Filter, Ammonium Filter	87
Deodorant Filter TCB-DF11BE/TCB-DF21BE/TCB-DF31BE/TCB-DF41BE	
Ammonium Filter TCB-DF11BE-AM/TCB-DF21BE-AM/TCB-DF31BE-AM/TCB-DF41BE-AM	

1 PRECAUTIONS FOR SAFETY

- Ensure that all Local, National and International regulations are satisfied.
- Read this "PRECAUTIONS FOR SAFETY" carefully before Installation.
- The precautions described below include the important items regarding safety. Observe them without fail.
- After the installation work, perform a trial operation to check for any problem.
Follow the Owner's Manual to explain how to use and maintain the unit to the customer.
- Turn off the main power supply switch (or breaker) before the unit maintenance.
- Ask the customer to keep the Installation Manual together with the Owner's Manual.

CAUTION**New Refrigerant Air Conditioner Installation**

- **THIS AIR CONDITIONER ADOPTS THE NEW HFC REFRIGERANT (R410A) WHICH DOES NOT DESTROY OZONE LAYER.**

The characteristics of R410A refrigerant are ; easy to absorb water, oxidizing membrane or oil, and its pressure is approx. 1.6 times higher than that of refrigerant R22. Accompanied with the new refrigerant, refrigerating oil has also been changed. Therefore, during installation work, be sure that water, dust, former refrigerant, or refrigerating oil does not enter the refrigerating cycle.

To prevent charging an incorrect refrigerant and refrigerating oil, the sizes of connecting sections of charging port of the main unit and installation tools are charged from those for the conventional refrigerant.

Accordingly the exclusive tools are required for the new refrigerant (R410A).

For connecting pipes, use new and clean piping designed for R410A, and please care so that water or dust does not enter. Moreover, do not use the existing piping because there are problems with pressure-resistance force and impurity in it.

CAUTION**To Disconnect the Appliance from Main Power Supply.**

This appliance must be connected to the main power supply by means of a switch with a contact separation of at least 3 mm.

The installation fuse (25A D type ) must be used for the power supply line of this conditioner.

**WARNING**

- **Ask an authorized dealer or qualified installation professional to install/maintain the air conditioner.**
Inappropriate installation may result in water leakage, electric shock or fire.
- **Turn off the main power supply switch or breaker before attempting any electrical work.**
Make sure all power switches are off. Failure to do so may cause electric shock.
- **Connect the connecting cable correctly.**
If the connecting cable is connected in a wrong way, electric parts may be damaged.
- **When moving the air conditioner for the installation into another place, be very careful not to enter any gaseous matter other than the specified refrigerant into the refrigeration cycle.**
If air or any other gas is mixed in the refrigerant, the gas pressure in the refrigeration cycle becomes abnormally high and it may resultingly causes pipe burst and injuries on persons.
- **Do not modify this unit by removing any of the safety guards or by bypassing any of the safety interlock switches.**
- **Exposure of unit to water or other moisture before installation may cause short-circuit of electrical parts.**
Do not store it in a wet basement or expose to rain or water.

- After unpacking the unit, examine it carefully if there are possible damage.
- Do not install in a place that might increase the vibration of the unit.
- To avoid personal injury (with sharp edges), be careful when handling parts.
- Perform installation work properly according to the Installation Manual.
Inappropriate installation may result in water leakage, electric shock or fire.
- When the air conditioner is installed in a small room, provide appropriate measures to ensure that the concentration of refrigerant leakage occur in the room does not exceed the critical level.
- Install the air conditioner securely in a location where the base can sustain the weight adequately.
- Perform the specified installation work to guard against an earthquake.
If the air conditioner is not installed appropriately, accidents may occur due to the falling unit.
- If refrigerant gas has leaked during the installation work, ventilate the room immediately.
If the leaked refrigerant gas comes in contact with fire, noxious gas may generate.
- After the installation work, confirm that refrigerant gas does not leak.
If refrigerant gas leaks into the room and flows near a fire source, such as a cooking range, noxious gas might generate.
- Electrical work must be performed by a qualified electrician in accordance with the Installation Manual. Make sure the air conditioner uses an exclusive power supply.
An insufficient power supply capacity or inappropriate installation may cause fire.
- Use the specified cables for wiring connect the terminals securely fix. To prevent external forces applied to the terminals from affecting the terminals.
- Be sure to provide grounding.
Do not connect ground wires to gas pipes, water pipes, lightning rods or ground wires for telephone cables.
- Conform to the regulations of the local electric company when wiring the power supply.
Inappropriate grounding may cause electric shock.
- Do not install the air conditioner in a location subject to a risk of exposure to a combustible gas.
If a combustible gas leaks, and stays around the unit, a fire may occur.

Required tools for installation work

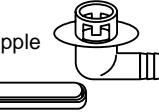
1) Philips screwdriver	9) Thermometer
2) Hole core drill (65 mm)	10) Mega-tester
3) Spanner	11) Electro circuit tester
4) Pipe cutter	12) Hexagonal wrench
5) Knife	13) Flare tool
6) Reamer	14) Pipe bender
7) Gas leak detector	15) Level vial
8) Tape measure	16) Metal saw

R410A (Special requirement)

- 17) Gauge manifold
(Charge hose : R410A special requirement)
- 18) Vacuum pump
(Charge hose : R410A special requirement)
- 19) Torque wrench
1/4 (17 mm) 16 N•m (1.6 kgf•m)
3/8 (22 mm) 42 N•m (4.2 kgf•m)
1/2 (26 mm) 55 N•m (5.5 kgf•m)
5/8 (15.9 mm) 120 N•m (12.0 kgf•m)
- 20) Copper pipe gauge adjusting projection margin
- 21) Vacuum pump adapter

2 ACCESSORY AND REFRIGERANT

Accessory and Installation Parts

①		Outdoor unit Installation manual x 1	③		Protective bush (For SM800AT only)
②		Drain nipple Waterproof rubber cap	④		Guard material for passage part (For SM800AT only)

Refrigerant Piping

- Piping kit used for the conventional refrigerant cannot be used.
- Use copper pipe with 0.8 mm or more thickness for Ø6.4, Ø9.5, Ø12.7.
Use copper pipe with 1.0 mm or more thickness for Ø15.9.
- Flare nut and flare works are also different from those of the conventional refrigerant. Take out the flare nut attached to the main unit of the air conditioner, and use it.

3 SELECTION OF INSTALLATION

Before installation

Be careful to the following items before installation.

Length of refrigerant pipe

<SM560AT-E>

Length of refrigerant pipe connected to indoor/outdoor unit	Item
20m or shorter	Addition of refrigerant is unnecessary at the local site.
*21m to 30m	<Addition of refrigerant> Add 20g of refrigerant for every 1m of pipe which exceeds 20m.

* Caution at addition of refrigerant

When the total length of refrigerant pipe exceeds 20m, add 20g/m of refrigerant and the maximum total length of pipe is 30m.

(Max. amount of additional refrigerant is 200g.)

Charge the refrigerant accurately. Overcharge may cause a serious trouble of compressor.

<SM800AT-E>

Length of refrigerant pipe connected to indoor/outdoor unit	Item
20m or shorter	Addition of refrigerant is unnecessary at the local site.
*21m to 50m	<Addition of refrigerant> Add 40g of refrigerant for every 1m of pipe which exceeds 20m.

* Caution at addition of refrigerant

When the total length of refrigerant pipe exceeds 20m, add 40g/m of refrigerant and the maximum total length of pipe is 50m.

(Max. amount of additional refrigerant is 1200g.)

Charge the refrigerant accurately. Overcharge may cause a serious trouble of compressor.

Air purge

- For air purge, use a vacuum pump.
- Do not use refrigerant charged in the outdoor unit for air purge. (The refrigerant for air purge is not contained in the outdoor unit.)

Electrical cabling

- Be sure to fix the power cables and indoor/outdoor connecting cables with clamps so that they do not contact with the cabinet, etc.

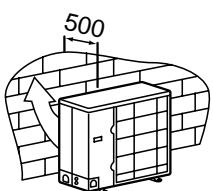
Installation Place

- A place which provides a specified space around the outdoor unit.
- A place where the operation noise and discharged air are not given to your neighbors.
- A place that is not exposed to a strong wind.
- A place that does not block a passage.
- When the outdoor unit is installed in an elevated position, be sure to secure its feet.
- There must be sufficient space for carrying in the unit.
- A place where the drain water does not make any problem.

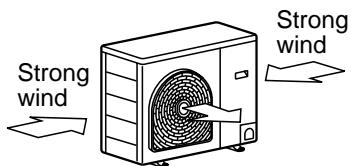
CAUTION

1. Install the outdoor unit at a place where discharge air is not blocked.
2. When an outdoor unit is installed in a place that is always exposed to a strong wind like a coast or on a high story of a building, secure a normal fan operation by using a duct or a wind shield.
3. When installing the outdoor unit in a place that is constantly exposed to a strong wind such as the upper stairs or rooftop of a building, apply the windproof measures referring to the following examples.

1) Install the unit so that its discharge port faces to the wall of the building. Keep a distance 500 mm or more between the unit and the wall surface.



2) Supposing the wind direction during the operation season of the air conditioner, install the unit so that the discharge port is set at right angle to the wind direction.



4. Installation in the following places may result in some troubles. Do not install the unit in such places below.

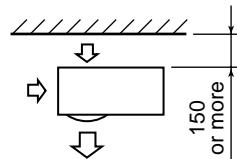
- A place full of machine oil.
- A place full of sulfuric gas.
- A place where high-frequency radio waves are likely to be generated as from audio equipment, welders, and medical equipment.

Necessary Space for Installation

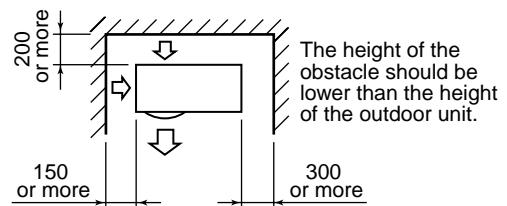
Obstacle at rear side

<Upper side is free>

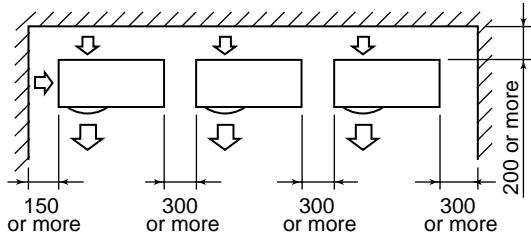
1. Single unit installation



2. Obstacles at both right and left sides.

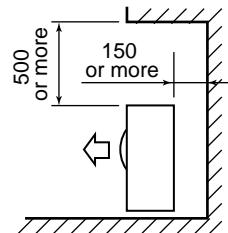


3. Serial installation of two or more units



The height of the obstacle should be lower than the height of the outdoor unit.

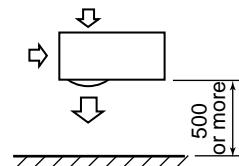
<Obstacle also at the upper side>



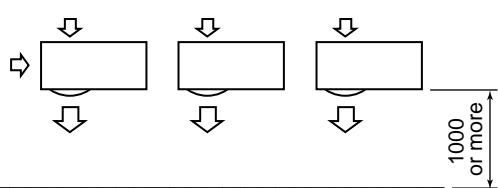
Obstacle at front side

<Upper side is free>

1. Single unit installation

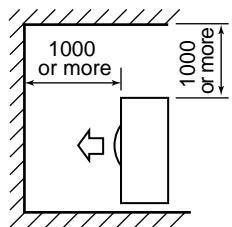


2. Serial installation of two or more units



3 SELECTION OF INSTALLATION

<Obstacle also at the upper side>

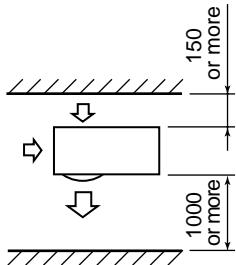


Obstacles at both front and rear sides

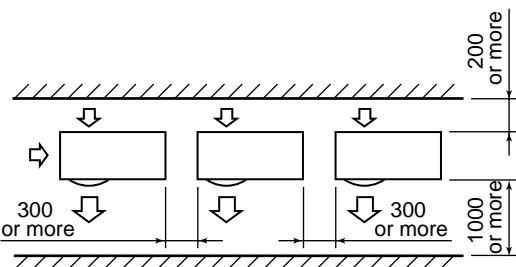
Open the upper side and both right and left sides. The height of obstacle at both front and rear side, should be lower than the height of the outdoor unit.

<Standard installation>

1. Single unit installation



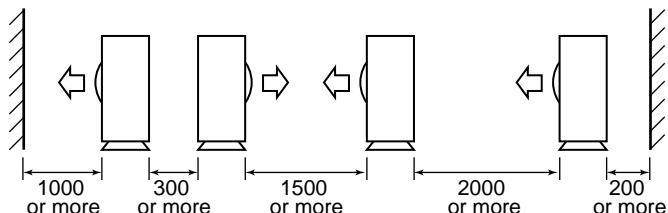
2. Serial installation of two or more units



Serial installation at front and rear sides

Open the upper side and both right and left sides. The height of obstacle at both front and rear sides should be lower than the height of the outdoor unit.

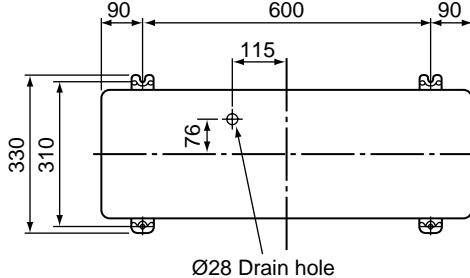
<Standard installation>



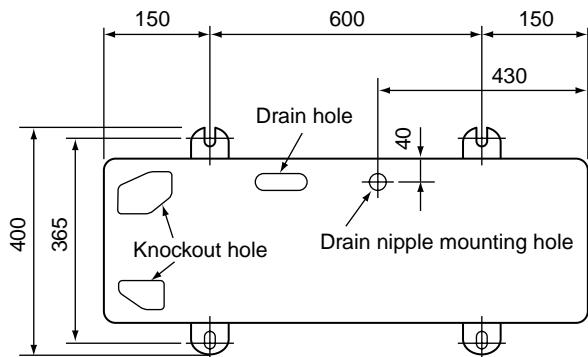
Installation of Outdoor Unit

- Before installation, check strength and horizontality of the base so that abnormal sound does not generate.
- According to the following base diagram, fix the base firmly with the anchor bolts.
(Anchor bolt, nut: M10 x 4 pairs)

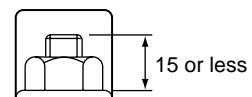
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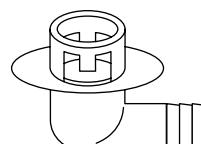
<SM800AT-E>



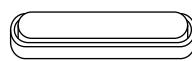
Set the out margin of the anchor bolt to 15mm or less.



- In case of draining through the drain hose, attach the following drain nipple and the waterproof rubber cap, and use the drain hose (Inner diam.: 16mm) sold on the market. And also seal the screws securely with silicone material, etc. so that water does not drop down. Some conditions may cause dewing or dripping of water.

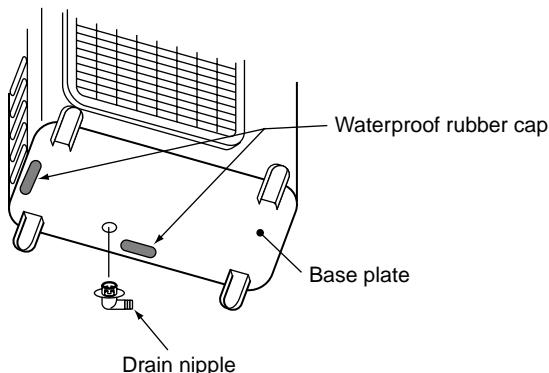


Drain nipple

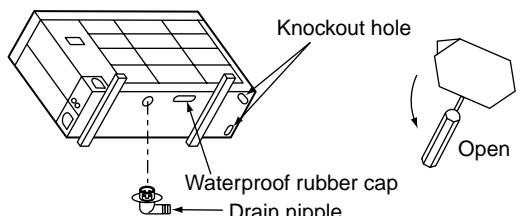


Waterproof rubber cap

<SM560AT-E>



<SM800AT-E>



Refrigerant Piping Connection

CAUTION

TAKE NOTICE THESE IMPORTANT 4 POINTS BELOW FOR PIPING WORK

1. Keep dust and moisture away from inside the connecting pipes.
2. Tightly connect the connection between pipes and the unit.
3. Evacuate the air in the connecting pipes using VACUUM PUMP.
4. Check gas leak at connected points.

<Piping connection>

Capacity rank RAV-	Liquid side		Gas side	
	Outer diameter	Thickness	Outer diameter	Thickness
SM560	Ø6.4	0.8	Ø12.7	0.8
SM800	Ø9.5	0.8	Ø15.9	1.0

- When there is a possibility of freezing of drain at the cold district or a snowfall area, be careful for drainage ability of drain. The drainage ability increases when a knockout hole on the base plate is opened. (Open the knockout hole to outside using a screwdriver, etc.)

Optional Installation Parts (Local Procure)

	Parts name	Q'ty
A	Refrigerant piping Liquid side : Ø6.35 mm or Ø9.52 mm Gas side : Ø12.7 mm or Ø15.9 mm	Each one
B	Pipe insulating material (polyethylene foam, 6 mm thick)	1
C	Putty, PVC tapes	Each one

For Reference

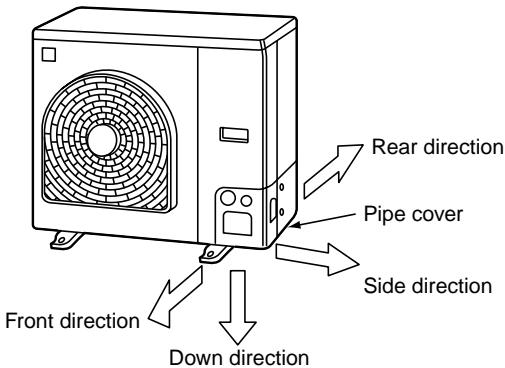
If a heating operation would be continuously performed for a long time under the condition that the outdoor temperature is 0°C or lower, draining of defrosted water may be difficult due to freezing of the bottom plate, resulting in a trouble of the cabinet or fan.

It is recommended to procure an anti-freeze heater locally for a safety installation of the air conditioner. For details, contact the dealer.

3 SELECTION OF INSTALLATION

Knockout of Pipe Cover

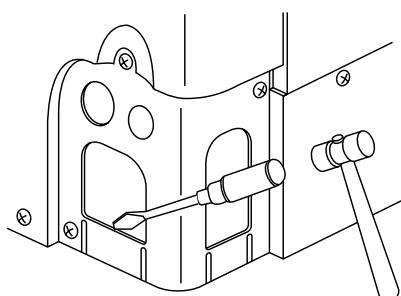
<SM800AT-E>



Knockout procedure

- The indoor/outdoor connecting pipes can be connected to 4 directions.
- Take off the knockout part of the pipe cover in which pipes or wires pass through the base plate.
- As shown in the figure, do not remove the pipe cover from the cabinet so that the knockout hole can be easily punched. To knock out, it is easily taken off by hands by punching a position at the lower side of 3 connected parts with screwdriver along the guideline.
- After marking the knockout hole, remove the burr and mount the attached protective bush and guard material for pass-through part in order to protect pipes and wires.

After connecting the pipes, be sure to mount the pipe cover. The pipe cover is easily mounted by cutting off the slit at the lower part of the pipe cover.



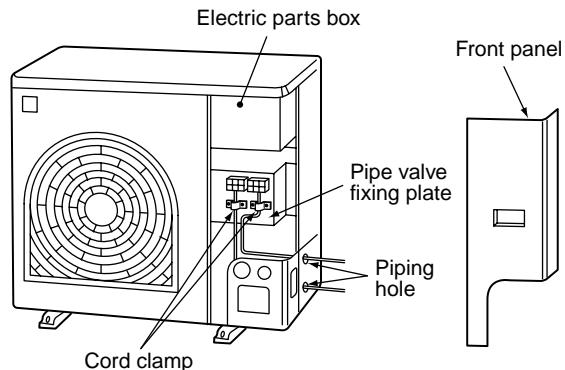
How to remove the front panel

1. Remove screws of the front panel.
2. Pull the front panel downward.

Removing the front panel, the electric parts appear at the front side.

- The metal pipes are attachable to the piping holes. If the size of the used power pipe does not match with the hole, adjust the hole size to match with pipe size.
- Be sure to fix the power cable and indoor/outdoor connecting cable with bundling band sold on the market so that they do not make contact with the compressor and discharge pipe. (Temperature of the compressor and discharge pipe becomes high.)

In order to avoid the force applied to on the connecting section, be sure to fix the cables to the cord clamps provided on the pipe valve fixing plate and the electric parts box.



4 REFRIGERANT PIPING

Pipe Forming/End Positioning

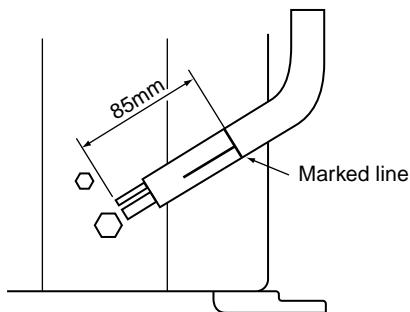
<SM560AT-E>

• Forming of pipe

Form the pipe along with a marked line of the cabinet.

• End positioning of pipe

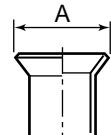
Match the ends of both pipes at a distance of 85 mm apart from the marked line.



• Flaring size : A (Unit : mm)

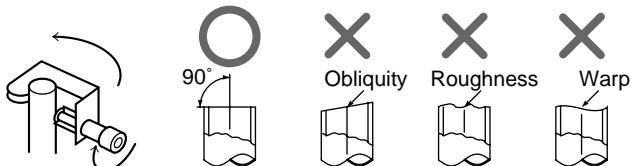
Outer diam. of copper pipe	A ^{+0.4} _{-0.4}	
	R410A	R22
6.35	9.1	9.0
9.52	13.2	13.0
12.7	16.6	16.2
15.9	19.7	19.4

* In case of flaring for R410A with the conventional flare tool, pull it out approx. 0.5 mm more than that of R22 to adjust to the specified flare size. The copper pipe gauge is useful for adjusting projection margin size.



Flaring

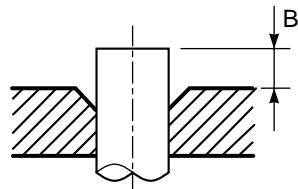
1. Cut the pipe with a pipe cutter.



2. Insert a flare nut into the pipe, and flare the pipe.

As the flaring sizes of R410A differ from those of refrigerant R22, the flare tools newly manufactured for R410A are recommended.

However, the conventional tools can be used by adjusting projection margin of the copper pipe.



• Projection margin in flaring : B (Unit : mm)

Rigid (Clutch type)

Outer diam. of copper pipe	R410A tool used		Conventional tool used	
	R410A	R22	R410A	R22
6.35	0 to 0.5	(Same as left)	1.0 to 1.5	0.5 to 1.0
9.52	0 to 0.5	(Same as left)	1.0 to 1.5	0.5 to 1.0
12.7	0 to 0.5	(Same as left)	1.0 to 1.5	0.5 to 1.0
15.9	0 to 0.5	(Same as left)	1.0 to 1.5	0.5 to 1.0

Imperial (Wing nut type)

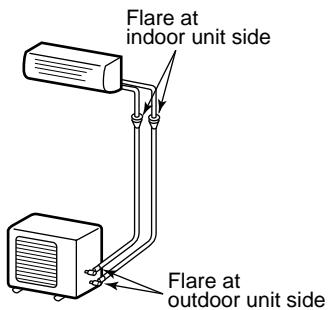
Outer diam. of copper pipe	R410A	R22
6.35	1.5 to 2.0	1.0 to 1.5
9.52	1.5 to 2.0	1.0 to 1.5
12.7	2.0 to 2.5	1.5 to 2.0
15.9	2.0 to 2.5	1.5 to 2.0

4 REFRIGERANT PIPING

Tightening of Connecting Part

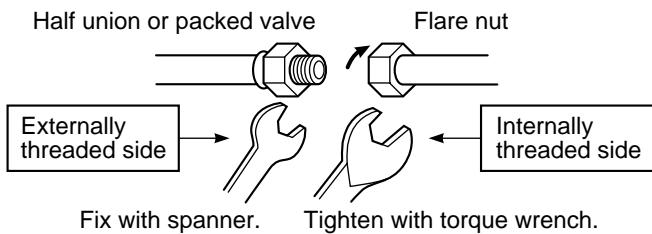
(Unit: N·m)

Outer diam. of copper pipe	Tightening torque
6.35mm (diam.)	14 to 18 (1.4 to 1.8kgf·m)
9.52mm (diam.)	33 to 42 (3.3 to 4.2kgf·m)
12.7mm (diam.)	50 to 62 (5.0 to 6.2kgf·m)
15.9mm (diam.)	68 to 82 (6.8 to 8.2kgf·m)



- Align the centers of the connecting pipes and tighten the flare nut strong as far as possible with your fingers.

Then fix the nut with a spanner and tighten it with torque wrench as shown in the figure.



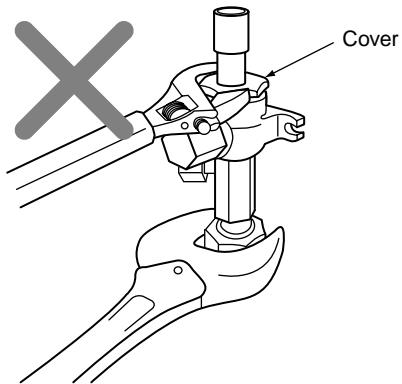
- As shown in the figure, be sure to use a double spanner to loosen or tighten the flare nut of the valve at gas side. If using a single spanner, the nut cannot be tightened with necessary tightening torque.

On the contrary, use a single spanner to loosen or tighten the flare nut of the valve at liquid side.

REQUIREMENT

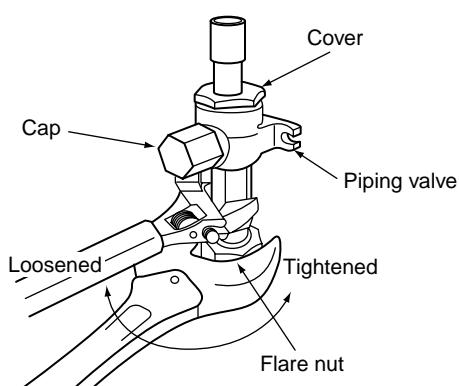
- Do not put the spanner on the cap. The valve may be broken.
- If applying excessive torque, the nut may be broken according to some installation conditions.

- After the installation work, be sure to check gas leak of connecting part of the pipes with nitrogen.



- Pressure of R410A is higher than that of R22 (Approx. 1.6 times). Therefore, using a torque wrench, tighten the flare pipe connecting sections which connect the indoor/outdoor units at the specified tightening torque. Incomplete connections may cause not only a gas leak, but also a trouble of the refrigeration cycle.

Do not apply refrigerating machine oil to the flared surface.



SM800 type valve at gas side

5 EVACUATING

Air Purge

This air conditioner can be installed up to the connecting pipe length and height difference in the following table.

Capacity rank	Max. connecting pipe length (m)	Height difference (m)		Hexagonal wrench size
		Outdoor unit at upper side	Outdoor unit at lower side	
SM560 type	30	30	15	
SM800 type	50	30	15	4mm

With respect to the preservation of terrestrial environment, adopt "Vacuum pump" for air purge (Evacuate air in the connecting pipes) when installing the unit.

- Do not discharge the refrigerant gas to the atmosphere to preserve the terrestrial environment.
- Use a vacuum pump to discharge the air (nitrogen, etc.) remained in the set. If the air remains, the capacity may decrease.

For the vacuum pump, be sure to use one with backflow preventer so that the oil in the pump does not backflow into the pipe of the air conditioner when the pump stops. (If oil in the vacuum pump is put in an air conditioner including R410A, it may cause trouble on the refrigeration cycle.)

Vacuum pump

As shown in the right figure, connect the charge hose after the manifold valve are closed completely.



Attach the connecting port of the charge hose with a projection to push the valve core (setting pin) to the charge port of the set.



Open the handle Low fully.



Turn ON the vacuum pump (*1)



Loosen the flare nut of the packed valve (Gas side) a little to check the air passes through. (*2)



Tighten the flare nut again.



Execute vacuuming until the compound pressure gauge indicates -101kPa (-76cmHg). (*1)



Close handle Low completely.



Turn OFF the vacuum pump.



Leave the vacuum pump as it is for 1 or 2 minutes, and check the indicator of the compound pressure gauge does not return.



Open fully the valve stem or the valve handle. (First, at liquid side, then gas side)



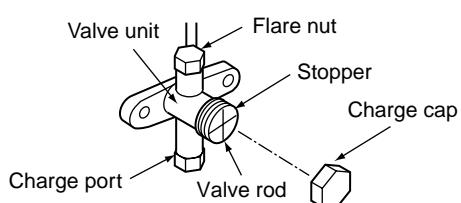
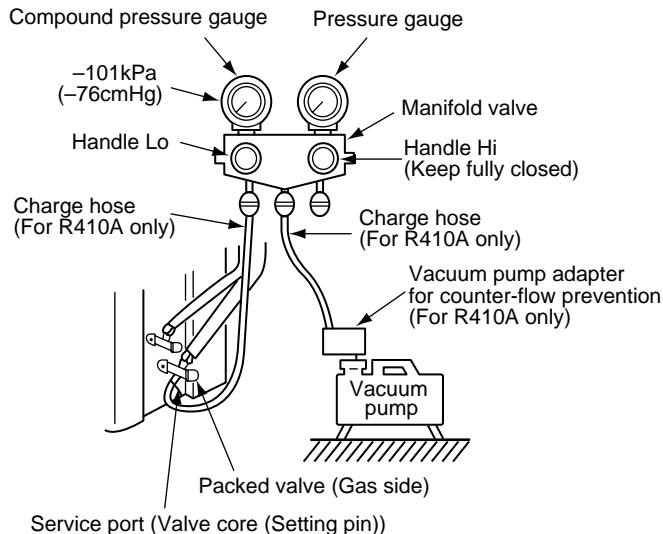
Disconnect the charge hose from the charge port.



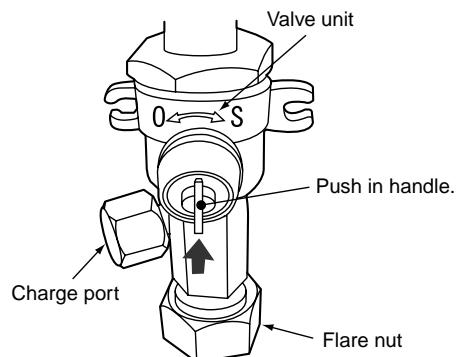
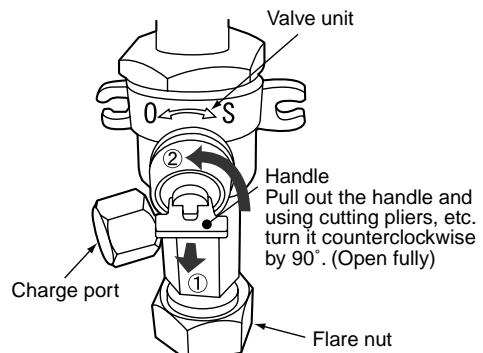
Tighten valve and caps of the charge port surely.

5 EVACUATING

<SM560AT-E>

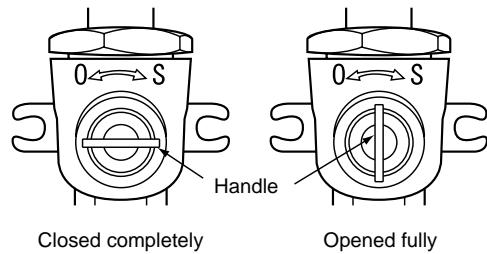
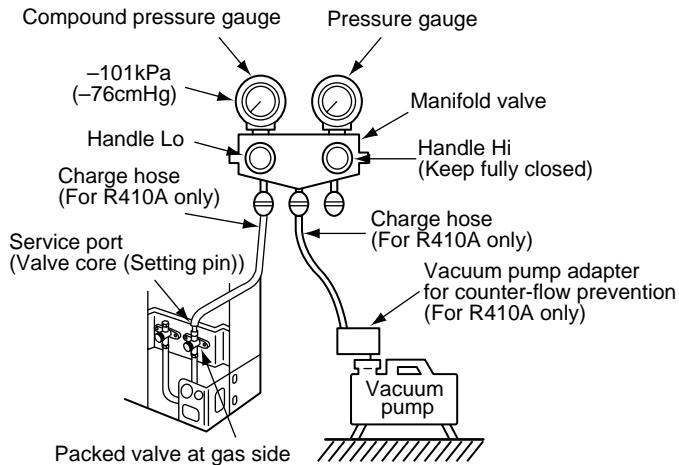


How to open the valve



Handle position

<SM800AT-E>



- *1. Use the vacuum pump, vacuum pump adapters, and gauge manifold referring to the manuals attached to each tool before using them. For the vacuum pump, check oil is filled up to the specified line of the oil gauge.
- *2. While the air is purged, check again that the connecting port of charge hose, which has a projection to push the valve core, is firmly connected to the charge port.

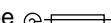
Valve handling precautions

- Open the valve stem or the handle until it strikes the stopper. It is unnecessary to apply further force.
- Securely tighten the cap with a torque wrench.
- Cap tightening torque

Valve size	Ø6.4	14 to 18N·m (1.4 to 1.8kgf·m)
	Ø9.5	33 to 42N·m (3.3 to 4.2kgf·m)
	Ø12.7	33 to 42N·m (3.3 to 4.2kgf·m)
	Ø15.9	20 to 25N·m (2.0 to 2.5kgf·m)
Charge port		14 to 18N·m (1.4 to 1.8kgf·m)

6 ELECTRICAL WORK

For the air conditioner that has no power cable, connect a power cable as mentioned below.

Model	RAV-	SM560AT-E	SM800AT-E
Power supply		220 – 240 V Single phase 50 Hz	
Maximum running current	12A	15A	
Installation fuse rating	25 A (D type 		
Power cable	H07 RN-F or 245 IEC 66 (2.5 mm ² or more)		

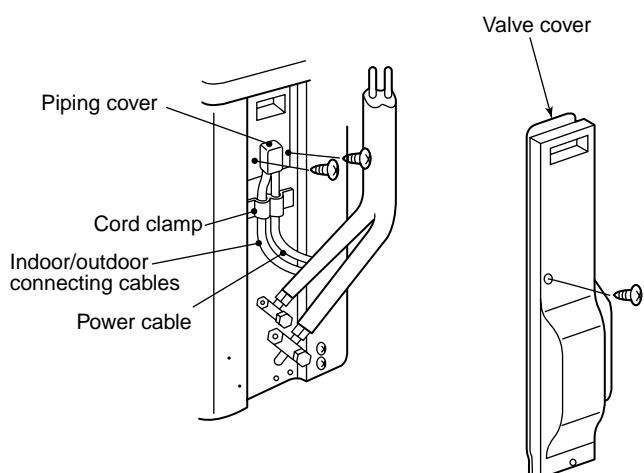
CAUTION

- Wrong wiring may cause a burnout to some electrical parts.
- Be sure to use the cord clamps attached to the product.
- Do not damage or scratch the conductive core and inner insulator of power and inter-connecting cables when peeling them.
- Be sure to comply with local regulations of the cable from outdoor unit to indoor unit.
(wire size and cabling method etc.)
- Use the power and Inter-connecting cables with specified thickness, specified type and protective devices required.

<SM560AT-E>

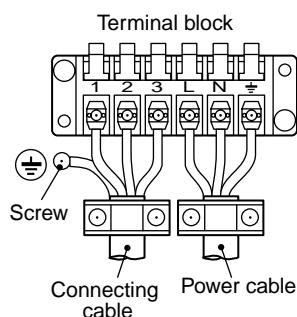
How to remove the valve cover

1. Remove screws of the valve cover.
2. Pull the valve cover downward to remove it.

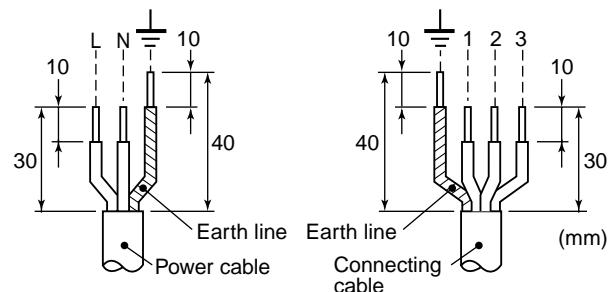


How to wire

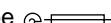
1. Connect the connecting cable to the terminal as identified with their respective numbers on the terminal block of indoor and outdoor unit.
H07 RN-F or 245 IEC 66 (1.0 mm² or more)
2. When connecting the connecting cable to the outdoor unit terminal, prevent water coming in the outdoor unit.
3. Insulate the unsheathed cords (conductors) with electrical insulation tape. Process them so that they do not touch any electrical or metal parts.
4. For inter connecting cable, do not use a wire jointed to another on the way.
Use wires long enough to cover the entire length.



Stripping length power cord and connecting cable



CAUTION

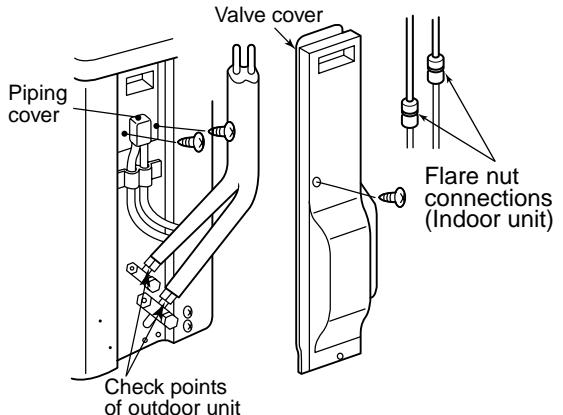
- The installation fuse (25A D type ) must be used for the power supply line of this air conditioner.
- Incorrect/incomplete wiring might cause an electrical fire or smoke.
- Prepare the exclusive power supply for the air conditioner.
- This product can be connected to the mains.
Connection to the fixed wiring :
A switch which disconnects all poles and has a contact separation of at least 3 mm must be incorporated in the fixed wiring.

7 FINAL INSTALLATION CHECKS

Check and Test Operation

For R410A, use the leak detector exclusively manufactured for HFC refrigerant (R410A, R134a, etc.).

- * The conventional leak detector for HCFC refrigerant (R22, etc.) cannot be used because its sensitivity for HFC refrigerant lowers to approx. 1/40.
- Pressure of R410A is approx. 1.6 times higher than that of R22.
- If installation work is incompletely finished, a gas leakage may occur when pressure rises during operation.
- Therefore, be sure to test the piping connections for leakage.
- Check gas leakage at the flare nut connections, valve stem cap connections and service port cap fittings with a leak detector or soap water.



CAUTION

When the remote controller is used for the first time, it accepts an operation approx. 5 minutes after the power supply has been turned on.

It is not a trouble, but is because the setup of the remote controller is being checked.

For the second power-ON time and after, approx. 1 minute is required to start the operation by the remote controller.

Useful Functions (SM800AT-E only)

Self-Diagnosis by LED Indication

In addition to the code checking by remote controller of the indoor unit, troubles of the outdoor unit can be diagnosed by LED indications on the cycle control P.C. board of the outdoor unit. Utilize them for various checks.

For the check by remote controller of the indoor unit, refer to the Installation Manual of the indoor unit.

Before a check, confirm each bit of the DIP switch is set to OFF position.

LED indication and code checking

LED indication	Cycle control P.C. board				Cause	
	LED indication					
	D800	D801	D802	D803		
D800 ○ : Red D801 ○ : Yellow D802 ○ : Yellow D803 ○ : Yellow ◎ : Rapid flash ● : Go off ○ : Go on	○	●	●	●	Heat exchanger sensor (TE) error	
	●	●	○	●	Suction sensor (TS) error	
	○	○	●	●	Discharge sensor (TD) error	
	●	○	●	○	High-pressure protection error	
	●	○	●	●	Outdoor temperature sensor (TO) error	
	○	○	○	●	DC outside fan error	
	○	●	●	○	Communication error between IPDU (Abnormal stop)	
	●	○	●	○	High-pressure release operation	
	●	○	○	●	Discharge temp. error	
	○	○	●	○	EEPROM error	
	●	●	○	○	Communication error between IPDU (No abnormal stop)	
	◎	●	●	●	G-Tr short-circuit protection	
	●	◎	●	●	Detect circuit error	
	◎	◎	●	●	Current sensor error	
	●	●	◎	●	Comp. lock error	
	◎	●	◎	●	Comp. break down	

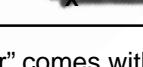
Installation/Servicing Tools

Changes in the product and components

In the case of an air conditioner using R410A, in order to prevent any other refrigerant from being charged accidentally, service port diameter of the outdoor unit control valve (3 way valve) has been changed. (1/2 UNF 20 threads per inch)

- In order to increase the pressure resisting strength of the refrigerant piping flare processing diameter and size of opposite side of flare nuts has been changed. (for copper pipes with nominal dimensions 1/2 and 5/8)

New tools for R410A

New tools for R410A	Applicable to R22 model	Changes
Gauge manifold	<input checked="" type="checkbox"/>	 As pressure is high, it is impossible to measure by means of conventional gauge. In order to prevent any other refrigerant from being charged, each port diameter is changed.
Charge hose	<input checked="" type="checkbox"/>	 In order to increase pressure resisting strength, hose materials and port size are changed (to 1/2 UNF 20 threads per inch). When purchasing a charge hose, be sure to check the port size.
Electronic balance for refrigerant charging	<input type="checkbox"/>	 As pressure is high and gasification speed is fast, it is difficult to read the indicated value by means of charging cylinder, as air bubbles occur.
Torque wrench (nominal diam. 1/2, 5/8)	<input checked="" type="checkbox"/>	 The sizes of opposite sides of flare nuts have been increased. Incidentally, a common wrench is used for nominal diameters 1/4 and 3/8.
Flare tool (clutch type)	<input type="checkbox"/>	 By increasing the clamp bar's receiving hole, strength of spring in the tool has been improved.
Gauge for projection adjustment	—	— Used when flare is made with using conventional flare tool.
Vacuum pump adapter	<input type="checkbox"/>	 Connected to the conventional vacuum pump. It is necessary to use an adapter to prevent vacuum pump oil from flowing back to the charge hose. The charge hose connecting part has two ports - one for conventional refrigerant (7/16 UNF 20 threads per inch) and the other for R410A. If the vacuum pump oil (mineral) mixes with R410A, sludge may occur and damage the equipment.
Gas leakage detector	<input checked="" type="checkbox"/>	 Exclusive for HFC refrigerant.

- Incidentally, the "refrigerant cylinder" comes with the refrigerant designation (R410A) and protector coating in the U.S.'s ARI specified rose color (ARI color code: PMS 507).
- Also, the "charge port and packing for refrigerant cylinder" require 1/2 UNF 20 threads per inch corresponding to the charge hose's port size.

1 PRECAUTIONS FOR SAFETY

- Ensure that all Local, National and International regulations are satisfied.
- Read this "PRECAUTIONS FOR SAFETY" carefully before Installation.
- The precautions described below include the important items regarding safety. Observe them without fail.
- After the installation work, perform a trial operation to check for any problem.
Follow the Owner's Manual to explain how to use and maintain the unit to the customer.
- Turn off the main power supply switch (or breaker) before the unit maintenance.
- Ask the customer to keep the Installation Manual together with the Owner's Manual.

CAUTION**New Refrigerant Air Conditioner Installation**

- **THIS AIR CONDITIONER ADOPTS THE NEW HFC REFRIGERANT (R410A) WHICH DOES NOT DESTROY OZONE LAYER.**

The characteristics of R410A refrigerant are ; easy to absorb water, oxidizing membrane or oil, and its pressure is approx. 1.6 times higher than that of refrigerant R22. Accompanied with the new refrigerant, refrigerating oil has also been changed. Therefore, during installation work, be sure that water, dust, former refrigerant, or refrigerating oil does not enter the refrigerating cycle.

To prevent charging an incorrect refrigerant and refrigerating oil, the sizes of connecting sections of charging port of the main unit and installation tools are charged from those for the conventional refrigerant.

Accordingly the exclusive tools are required for the new refrigerant (R410A).

For connecting pipes, use new and clean piping designed for R410A, and please care so that water or dust does not enter. Moreover, do not use the existing piping because there are problems with pressure-resistance force and impurity in it.

CAUTION**To Disconnect the Appliance from Main Power Supply.**

This appliance must be connected to the main power supply by means of a switch with a contact separation of at least 3 mm.

The installation fuse (25A D type ) must be used for the power supply line of this conditioner.

**WARNING**

- **Ask an authorized dealer or qualified installation professional to install/maintain the air conditioner.**
Inappropriate installation may result in water leakage, electric shock or fire.
- **Turn off the main power supply switch or breaker before attempting any electrical work.**
Make sure all power switches are off. Failure to do so may cause electric shock.
- **Connect the connecting cable correctly.**
If the connecting cable is connected in a wrong way, electric parts may be damaged.
- **When moving the air conditioner for the installation into another place, be very careful not to enter any gaseous matter other than the specified refrigerant into the refrigeration cycle.**
If air or any other gas is mixed in the refrigerant, the gas pressure in the refrigeration cycle becomes abnormally high and it may resultingly causes pipe burst and injuries on persons.
- **Do not modify this unit by removing any of the safety guards or by bypassing any of the safety interlock switches.**
- **Exposure of unit to water or other moisture before installation may cause a short-circuit of electrical parts.**
Do not store it in a wet basement or expose to rain or water.

- After unpacking the unit, examine it carefully if there are possible damage.
- Do not install in a place that might increase the vibration of the unit.
- To avoid personal injury (with sharp edges), be careful when handling parts.
- Perform installation work properly according to the Installation Manual.
Inappropriate installation may result in water leakage, electric shock or fire.
- When the air conditioner is installed in a small room, provide appropriate measures to ensure that the concentration of refrigerant leakage occur in the room does not exceed the critical level.
- Install the air conditioner securely in a location where the base can sustain the weight adequately.
- Perform the specified installation work to guard against an earthquake.
If the air conditioner is not installed appropriately, accidents may occur due to the falling unit.
- If refrigerant gas has leaked during the installation work, ventilate the room immediately.
If the leaked refrigerant gas comes in contact with fire, noxious gas may generate.
- After the installation work, confirm that refrigerant gas does not leak.
If refrigerant gas leaks into the room and flows near a fire source, such as a cooking range, noxious gas might generate.
- Electrical work must be performed by a qualified electrician in accordance with the Installation Manual. Make sure the air conditioner uses an exclusive power supply.
An insufficient power supply capacity or inappropriate installation may cause fire.
- Use the specified cables for wiring connect the terminals securely fix. To prevent external forces applied to the terminals from affecting the terminals.
- Be sure to provide grounding.
Do not connect ground wires to gas pipes, water pipes, lightning rods or ground wires for telephone cables.
- Conform to the regulations of the local electric company when wiring the power supply.
Inappropriate grounding may cause electric shock.
- Do not install the air conditioner in a location subject to a risk of exposure to a combustible gas.
If a combustible gas leaks, and stays around the unit, a fire may occur.

Required tools for installation work

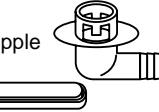
1) Philips screw driver	9) Thermometer
2) Hole core drill (65 mm)	10) Mega-tester
3) Spanner	11) Electro circuit tester
4) Pipe cutter	12) Hexagonal wrench
5) Knife	13) Flare tool
6) Reamer	14) Pipe bender
7) Gas leak detector	15) Level vial
8) Tape measure	16) Metal saw

R410A (Special requirement)

- 17) Gauge manifold
(Charge hose : R410A special requirement)
- 18) Vacuum pump
(Charge hose : R410A special requirement)
- 19) Torque wrench
1/4 (17 mm) 16 N•m (1.6 kgf•m)
3/8 (22 mm) 42 N•m (4.2 kgf•m)
1/2 (26 mm) 55 N•m (5.5 kgf•m)
5/8 (15.9 mm) 120 N•m (12.0 kgf•m)
- 20) Copper pipe gauge adjusting projection margin
- 21) Vacuum pump adapter

2 ACCESSORY AND REFRIGERANT

Accessory and Installation Parts

①		Outdoor unit Installation manual x 1	③		Protective bush
②		Drain nipple Waterproof rubber cap	④		Guard material for passage part

Refrigerant Piping

- Piping kit used for the conventional refrigerant cannot be used.
- Use copper pipe with 0.8 mm or more thickness for Ø9.5 mm.
Use copper pipe with 1.0 mm or more thickness for Ø15.9 mm.
- Flare nut and flare works are also different from those of the conventional refrigerant. Take out the flare nut attached to the main unit of the air conditioner, and use it.

3 SELECTION OF INSTALLATION

Before installation

Be careful to the following items before installation.

Length of refrigerant pipe

Length of refrigerant pipe connected to indoor/outdoor unit	Item
20m or shorter	Addition of refrigerant is unnecessary at the local site.
*21m to 50m	<Addition of refrigerant> Add 40g of refrigerant for every 1m of pipe which exceeds 20m.

* Caution at addition of refrigerant

When the total length of refrigerant pipe exceeds 20m, add 40g/m of refrigerant and the maximum total length of pipe is 50m.

(Max. amount of additional refrigerant is 1200g.)

Charge the refrigerant accurately. Overcharge may cause a serious trouble of compressor.

Air purge

- For air purge, use a vacuum pump.
- Do not use refrigerant charged in the outdoor unit for air purge. (The refrigerant for air purge is not contained in the outdoor unit.)

Electrical cabling

- Be sure to fix the power cables and indoor/outdoor connecting cables with clamps so that they do not contact with the cabinet, etc.

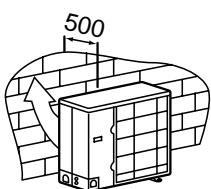
Installation Place

- A place which provides a specified space around the outdoor unit.
- A place where the operation noise and discharged air are not given to your neighbors.
- A place that is not exposed to a strong wind.
- A place that does not block a passage.
- When the outdoor unit is installed in an elevated position, be sure to secure its feet.
- There must be sufficient space for carrying in the unit.
- A place where the drain water does not make any problem.

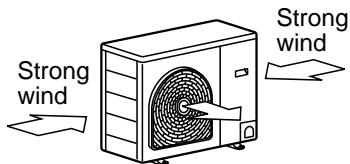
CAUTION

1. Install the outdoor unit at a place where discharge air is not blocked.
2. When an outdoor unit is installed in a place that is always exposed to a strong wind like a coast or on a high storey of a building, secure a normal fan operation by using a duct or a wind shield.
3. When installing the outdoor unit in a place that is constantly exposed to a strong wind such as the upper stairs or rooftop of a building, apply the windproof measures referring to the following examples.

- 1) Install the unit so that its discharge port faces to the wall of the building. Keep a distance 500 mm or more between the unit and the wall surface.



- 2) Supposing the wind direction during the operation season of the air conditioner, install the unit so that the discharge port is set at right angle to the wind direction.



4. Installation in the following places may result in some troubles. Do not install the unit in such places below.

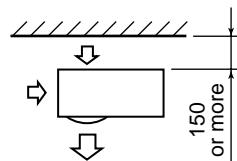
- A place full of machine oil.
- A place full of sulphuric gas.
- A place where high-frequency radio waves are likely to be generated as from audio equipment, welders, and medical equipment.

Necessary Space for Installation

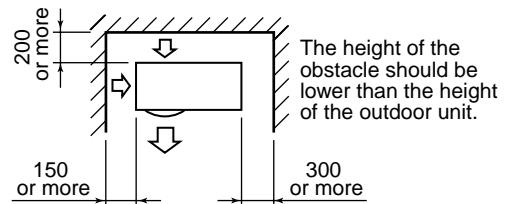
Obstacle at rear side

<Upper side is free>

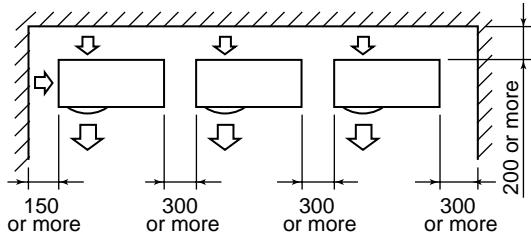
1. Single unit installation



2. Obstacles at both right and left sides.

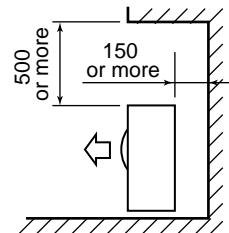


3. Serial installation of two or more units



The height of the obstacle should be lower than the height of the outdoor unit.

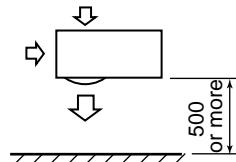
<Obstacle also at the upper side>



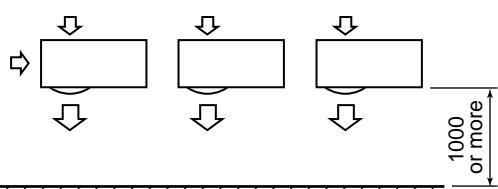
Obstacle at front side

<Upper side is free>

1. Single unit installation

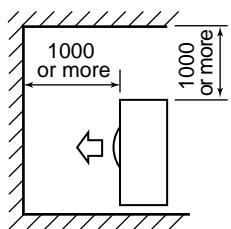


2. Serial installation of two or more units



3 SELECTION OF INSTALLATION

<Obstacle also at the upper side>

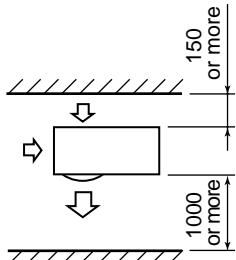


Obstacles at both front and rear sides

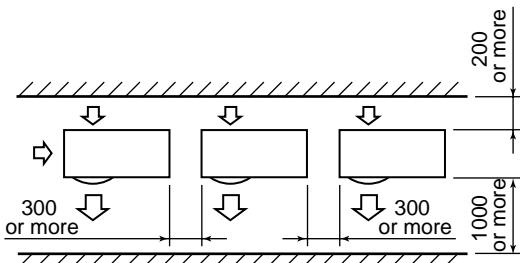
Open the upper side and both right and left sides. The height of obstacle at both front and rear side, should be lower than the height of the outdoor unit.

<Standard installation>

1. Single unit installation



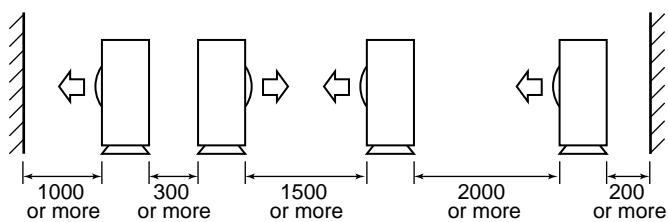
2. Serial installation of two or more units



Serial installation at front and rear sides

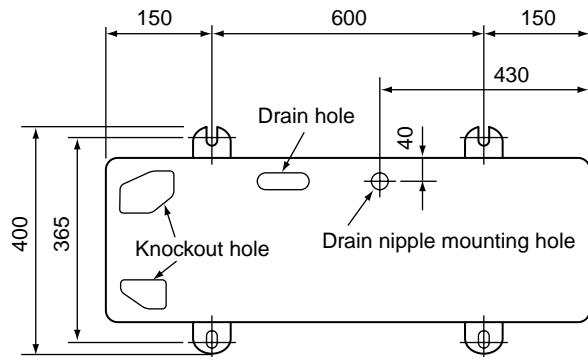
Open the upper side and both right and left sides. The height of obstacle at both front and rear sides should be lower than the height of the outdoor unit.

<Standard installation>

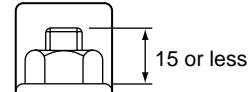


Installation of Outdoor Unit

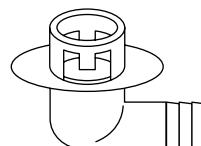
- Before installation, check strength and horizontality of the base so that abnormal sound does not generate.
- According to the following base diagram, fix the base firmly with the anchor bolts.
(Anchor bolt, nut: M10 x 4 pairs)



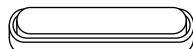
Set the out margin of the anchor bolt to 15mm or less.



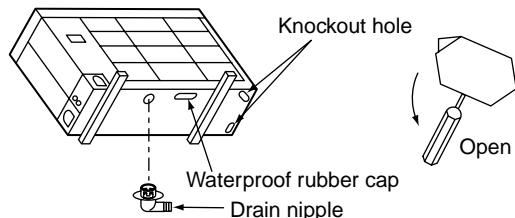
- In case of draining through the drain hose, attach the following drain nipple and the waterproof rubber cap, and use the drain hose (Inner diam.: 16mm) sold on the market. And also seal the screws securely with silicone material, etc. so that water does not drop down. Some conditions may cause dewing or dripping of water.



Drain nipple



Waterproof rubber cap

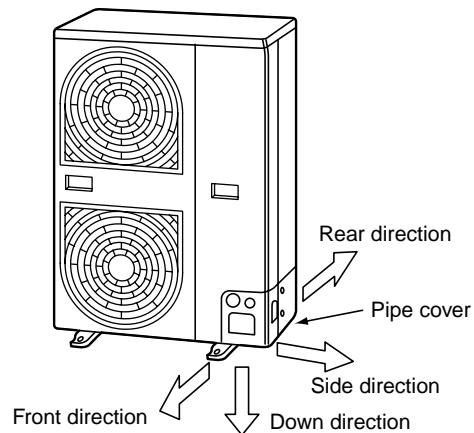


- When there is a possibility of freezing of drain at the cold district or a snowfall area, be careful for drainage ability of drain. The drainage ability increases when a knockout hole on the base plate is opened. (Open the knockout hole to outside using a screwdriver, etc.)

Optional Installation Parts (Local Procure)

	Parts name	Q'ty
A	Refrigerant piping Liquid side : Ø9.5 mm Gas side : Ø15.9 mm	Each one
B	Pipe insulating material (polyethylene foam, 6 mm thick)	1
C	Putty, PVC tapes	Each one

Knockout of Pipe Cover



Refrigerant Piping Connection

CAUTION

TAKE NOTICE THESE IMPORTANT 4 POINTS BELOW FOR PIPING WORK

1. Keep dust and moisture away from inside the connecting pipes.
2. Tightly connect the connection between pipes and the unit.
3. Evacuate the air in the connecting pipes using VACUUM PUMP.
4. Check gas leak at connected points.

< Piping connection >

Liquid side		Gas side	
Outer diameter	Thickness	Outer diameter	Thickness
Ø9.5	0.8	Ø15.9	1.0

Knockout procedure

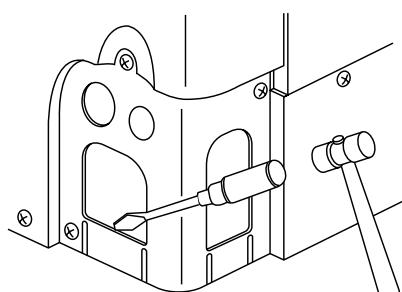
- The indoor/outdoor connecting pipes can be connected to 4 directions. Take off the knockout part of the pipe cover in which pipes or wires pass through the base plate.
- As shown in the figure, do not remove the pipe cover from the cabinet so that the knockout hole can be easily punched. To knock out, it is easily taken off by hands by punching a position at the lower side of 3 connected parts with screwdriver along the guide line.
- After marking the knockout hole, remove the burr and mount the attached protective bush and guard material for pass-through part in order to protect pipes and wires.

After connecting the pipes, be sure to mount the pipe cover. The pipe cover is easily mounted by cutting off the slit at the lower part of the pipe cover.

For Reference

If a heating operation would be continuously performed for a long time under the condition that the outdoor temperature is 0°C or lower, draining of defrosted water may be difficult due to freezing of the bottom plate, resulting in a trouble of the cabinet or fan.

It is recommended to procure an anti-freeze heater locally for a safety installation of the air conditioner. For details, contact the dealer.



3 SELECTION OF INSTALLATION

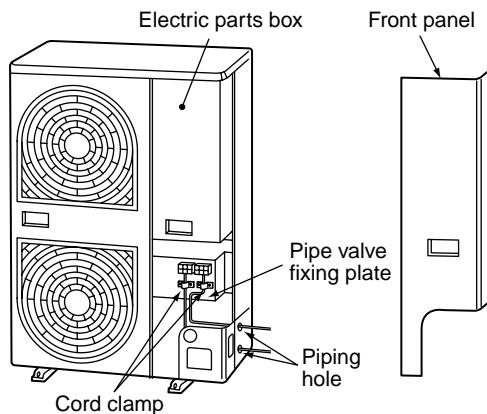
How to remove the front panel

1. Remove screws of the front panel.
2. Pull the front panel downward.

Removing the front panel, the electric parts appear at the front side.

- The metal pipes are attachable to the piping holes. If the size of the used power pipe does not match with the hole, adjust the hole size to match with pipe size.
- Be sure to fix the power cable and indoor/outdoor connecting cable with bundling band sold on the market so that they do not make contact with the compressor and discharge pipe. (Temperature of the compressor and discharge pipe becomes high.)

In order to avoid the force applied to on the connecting section, be sure to fix the cables to the cord clamps provided on the pipe valve fixing plate and the electric parts box.

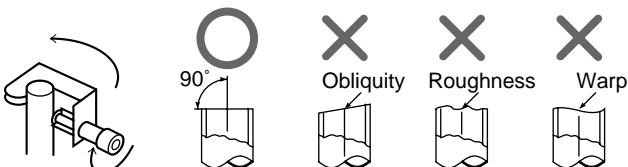


4 REFRIGERANT PIPING

Pipe Forming/End Positioning

Flaring

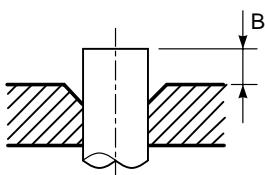
1. Cut the pipe with a pipe cutter.



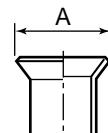
2. Insert a flare nut into the pipe, and flare the pipe.

As the flaring sizes of R410A differ from those of refrigerant R22, the flare tools newly manufactured for R410A are recommended.

However, the conventional tools can be used by adjusting projection margin of the copper pipe.



- * In case of flaring for R410A with the conventional flare tool, pull it out approx. 0.5 mm more than that of R22 to adjust to the specified flare size. The copper pipe gauge is useful for adjusting projection margin size.



• Projection margin in flaring : B (Unit : mm)

Rigid (Clutch type)

Outer dia. of copper pipe	R410A tool used		Conventional tool used	
	R410A	R22	R410A	R22
6.4	0 to 0.5	(Same as left)	1.0 to 1.5	0.5 to 1.0
9.5	0 to 0.5	(Same as left)	1.0 to 1.5	0.5 to 1.0
12.7	0 to 0.5	(Same as left)	1.0 to 1.5	0.5 to 1.0
15.9	0 to 0.5	(Same as left)	1.0 to 1.5	0.5 to 1.0

• Flaring size : A (Unit : mm)

Outer dia. of copper pipe	A ⁺⁰ _{-0.4}	
	R410A	R22
6.4	9.1	9.0
9.5	13.2	13.0
12.7	16.6	16.2
15.9	19.7	19.4

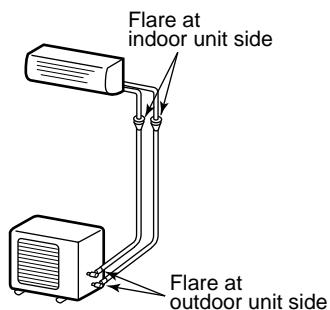
Imperial (Wing nut type)

Outer dia. of copper pipe	R410A	R22
6.4	1.5 to 2.0	1.0 to 1.5
9.5	1.5 to 2.0	1.0 to 1.5
12.7	2.0 to 2.5	1.5 to 2.0
15.9	2.0 to 2.5	1.5 to 2.0

Tightening of Connecting Part

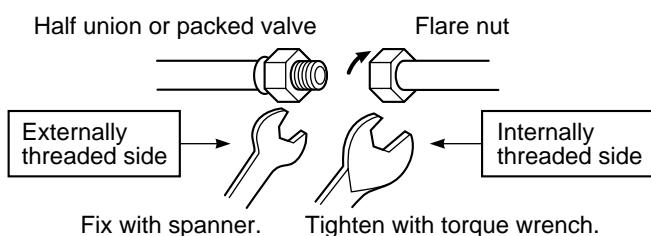
(Unit: N·m)

Outer dia. of copper pipe	Tightening torque
6.4 mm (diam.)	14 to 18 (1.4 to 1.8 kgf·m)
9.5 mm (diam.)	33 to 42 (3.3 to 4.2 kgf·m)
12.7 mm (diam.)	50 to 62 (5.0 to 6.2 kgf·m)
15.9 mm (diam.)	63 to 77 (6.3 to 7.7 kgf·m)



- Align the centers of the connecting pipes and tighten the flare nut strong as far as possible with your fingers.

Then fix the nut with a spanner and tighten it with torque wrench as shown in the figure.



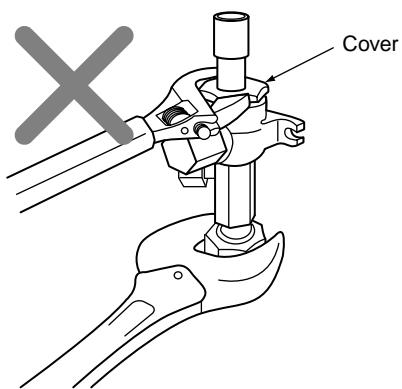
- As shown in the figure, be sure to use a double spanner to loosen or tighten the flare nut of the valve at gas side. If using a single spanner, the nut cannot be tightened with necessary tightening torque.

On the contrary, use a single spanner to loosen or tighten the flare nut of the valve at liquid side.

REQUIREMENT

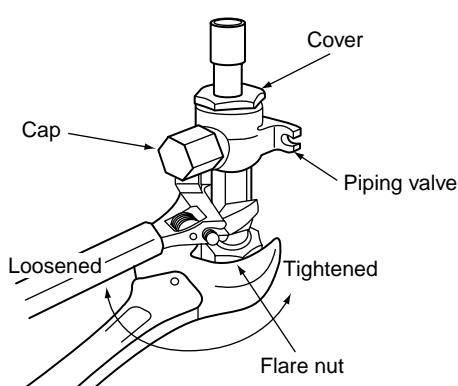
- Do not put the spanner on the cap. The valve may be broken.
- If applying excessive torque, the nut may be broken according to some installation conditions.

- After the installation work, be sure to check gas leak of connecting part of the pipes with nitrogen.



- Pressure of R410A is higher than that of R22 (Approx. 1.6 times). Therefore, using a torque wrench, tighten the flare pipe connecting sections which connect the indoor/outdoor units at the specified tightening torque. Incomplete connections may cause not only a gas leak, but also a trouble of the refrigeration cycle.

Do not apply refrigerating machine oil to the flared surface.



Valve at gas side

5 EVACUATING

Air Purge

This air conditioner can be installed up to the connecting pipe length and height difference in the following table.

Max. connecting pipe length (m)	Height difference (m)		Hexagonal wrench size
	Outdoor unit at upper side	Outdoor unit at lower side	
50	30	15	4 mm

With respect to the preservation of terrestrial environment, adopt "Vacuum pump" for air purge (Evacuate air in the connecting pipes) when installing the unit.

- Do not discharge the refrigerant gas to the atmosphere to preserve the terrestrial environment.
- Use a vacuum pump to discharge the air (nitrogen, etc.) remained in the set. If the air remains, the capacity may decrease.

For the vacuum pump, be sure to use one with backflow preventer so that the oil in the pump does not backflow into the pipe of the air conditioner when the pump stops. (If oil in the vacuum pump is put in an air conditioner including R410A, it may cause trouble on the refrigeration cycle.)

Vacuum pump

As shown in the right figure, connect the charge hose after the manifold valve are closed completely.

Attach the connecting port of the charge hose with a projection to push the valve core (setting pin) to the charge port of the set.

Open handle Low fully.

Turn ON the vacuum pump (*1)

Loosen the flare nut of the packed valve (Gas side) a little to check the air passes through. (*2)

Tighten the flare nut again.

Execute vacuuming until the compound pressure gauge indicates -101kPa (-76cmHg). (*1)

Close handle Low completely.

Turn OFF the vacuum pump.

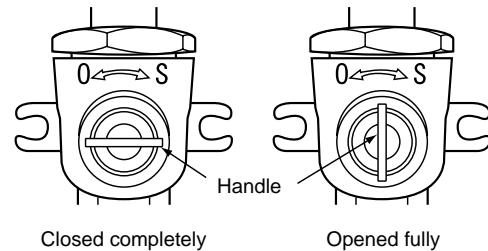
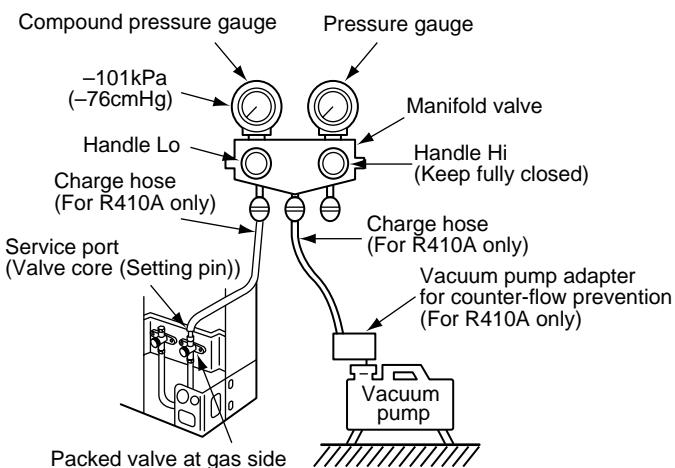
Leave the vacuum pump as it is for 1 or 2 minutes, and check the indicator of the compound pressure gauge does not return.

Open fully the valve stem or the valve handle. (First, at liquid side, then gas side)

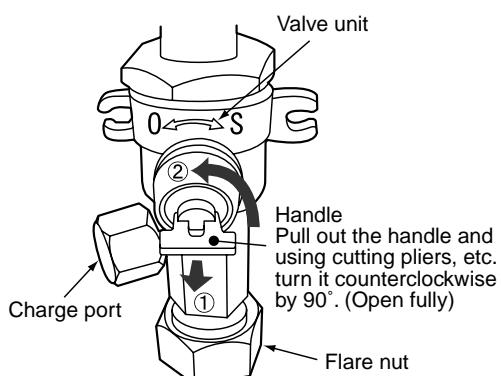
Disconnect the charge hose from the charge port.

Tighten valve and caps of the charge port surely.

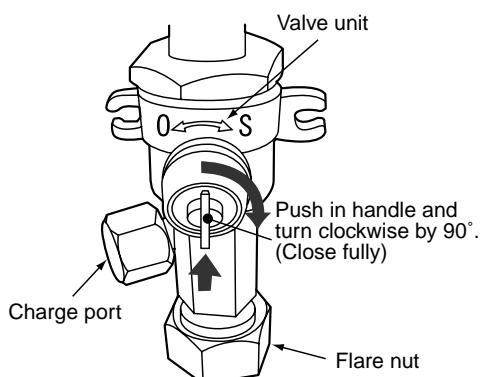
Handle position



How to open the valve



How to close the valve



- *1. Use the vacuum pump, vacuum pump adapters, and gauge manifold referring to the manuals attached to each tool before using them. For the vacuum pump, check oil is filled up to the specified line of the oil gauge.
- *2. While the air is purged, check again that the connecting port of charge hose, which has a projection to push the valve core, is firmly connected to the charge port.

Valve handling precautions

- Open the valve stem or the handle until it strikes the stopper. It is unnecessary to apply further force.
- Securely tighten the cap with a torque wrench.
- Cap tightening torque

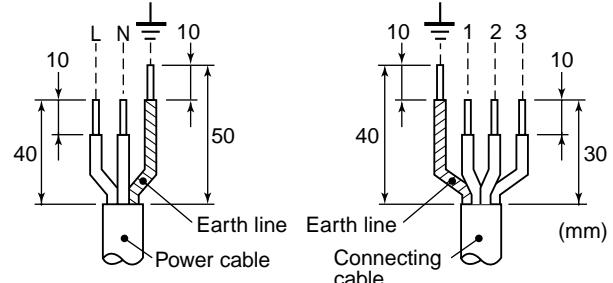
Valve size	Ø6.4	14 to 18N·m (1.4 to 1.8kgf·m)
	Ø9.5	33 to 42N·m (3.3 to 4.2kgf·m)
	Ø12.7	33 to 42N·m (3.3 to 4.2kgf·m)
	Ø15.9	20 to 25N·m (2.0 to 2.5kgf·m)
Charge port		14 to 18N·m (1.4 to 1.8kgf·m)

6 ELECTRICAL WORK

For the air conditioner that has no power cable, connect a power cable as mentioned below.

Model	RAV-	SM1100AT-E	SM1400AT-E
Power supply	220 – 240 V Single phase 50 Hz		
Maximum running current	22.0 A	22.8 A	
Installation fuse rating	25 A (D type )		
Power cable	H07 RN-F or 245 IEC 66 (2.5 mm ² or more)		

Stripping length power cord and connecting cable



CAUTION

- Wrong wiring may cause a burn-out to some electrical parts.
- Be sure to use the cord clamps attached to the product.
- Do not damage or scratch the conductive core and inner insulator of power and inter-connecting cables when peeling them.
- Be sure to comply with local regulations of the cable from outdoor unit to indoor unit.
(wire size and cabling method etc.)
- Use the power and Inter-connecting cables with specified thickness, specified type and protective devices required.

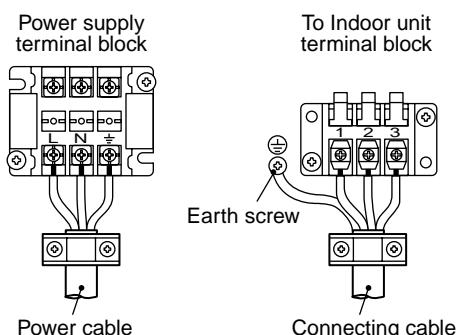
CAUTION

- The installation fuse (25A D type ) must be used for the power supply line of this air conditioner.
- Incorrect/incomplete wiring might cause an electrical fire or smoke.
- Prepare the exclusive power supply for the air conditioner.
- This product can be connected to the mains.
Connection to the fixed wiring :
A switch which disconnects all poles and has a contact separation of at least 3 mm must be incorporated in the fixed wiring.

How to wire

1. Connect the connecting cable to the terminal as identified with their respective numbers on the terminal block of indoor and outdoor unit.
H07 RN-F or 245 IEC 66 (1.0 mm² or more)
2. When connecting the connecting cable to the outdoor unit terminal, prevent water coming in the outdoor unit.
3. Insulate the unsheathed cords (conductors) with electrical insulation tape. Process them so that they do not touch any electrical or metal parts.
4. For inter connecting cable, do not use a wire jointed to another on the way.

Use wires long enough to cover the entire length.



7 FINAL INSTALLATION CHECKS

Check and Test Operation

For R410A, use the leak detector exclusively manufactured for HFC refrigerant (R410A, R134a, etc.).

* The conventional leak detector for HCFC refrigerant (R22, etc.) cannot be used because its sensitivity for HFC refrigerant lowers to approx. 1/40.

- Pressure of R410A is approx. 1.6 times higher than that of R22.

If installation work is incompletely finished, a gas leakage may occur when pressure rises during operation.

Therefore, be sure to test the piping connections for leakage.

- Check gas leakage at the flare nut connections, valve stem cap connections and service port cap fittings with a leak detector or soap water.

CAUTION

When the remote controller is used for the first time, it accepts an operation approx. 5 minutes after the power supply has been turned on.

It is not a trouble, but is because the setup of the remote controller is being checked.

For the second power-ON time and after, approx. 1 minute is required to start the operation by the remote controller.

Useful Functions

Self-Diagnosis by LED Indication

In addition to the code checking by remote controller of the indoor unit, troubles of the outdoor unit can be diagnosed by LED indications on the cycle control P.C. board of the outdoor unit. Utilize them for various checks.

For the check by remote controller of the indoor unit, refer to the Installation Manual of the indoor unit.

Before a check, confirm each bit of the DIP switch is set to OFF position.

LED indication and code checking

LED indication	Cycle control P.C. board				Cause	
	LED indication					
	D800	D801	D802	D803		
D800 ○ : Red D801 ○ : Yellow D802 ○ : Yellow D803 ○ : Yellow ◎ : Rapid flash ● : Go off ○ : Go on	○	●	●	●	Heat exchanger sensor (TE) error	
	●	●	○	●	Suction sensor (TS) error	
	○	○	●	●	Discharge sensor (TD) error	
	●	○	●	○	High-pressure protection error	
	●	○	●	●	Outdoor temperature sensor (TO) error	
	○	○	○	●	DC outside fan error	
	○	●	●	○	Communication error between IPDU (Abnormal stop)	
	●	○	●	○	High-pressure release operation	
	●	○	○	●	Discharge temp. error	
	○	○	●	○	EEPROM error	
	●	●	○	○	Communication error between IPDU (No abnormal stop)	
	◎	●	●	●	G-Tr short-circuit protection	
	●	◎	●	●	Detect circuit error	
	◎	◎	●	●	Current sensor error	
	●	●	◎	●	Comp. lock error	
	◎	●	◎	●	Comp. break down	

7 FINAL INSTALLATION CHECKS

Installation/Servicing Tools

Changes in the product and components

In the case of an air conditioner using R410A, in order to prevent any other refrigerant from being charged accidentally, service port diameter of the outdoor unit control valve (3 way valve) has been changed. (1/2 UNF 20 threads per inch)

- In order to increase the pressure resisting strength of the refrigerant piping flare processing diameter and size of opposite side of flare nuts has been changed. (for copper pipes with nominal dimensions 1/2 and 5/8)

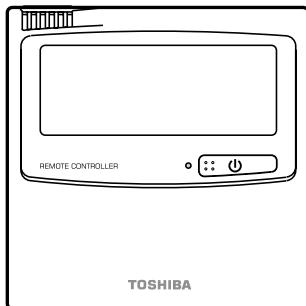
New tools for R410A

New tools for R410A	Applicable to R22 model	Changes
Gauge manifold	<input checked="" type="checkbox"/> 	As pressure is high, it is impossible to measure by means of conventional gauge. In order to prevent any other refrigerant from being charged, each port diameter is changed.
Charge hose	<input checked="" type="checkbox"/> 	In order to increase pressure resisting strength, hose materials and port size are changed (to 1/2 UNF 20 threads per inch). When purchasing a charge hose, be sure to check the port size.
Electronic balance for refrigerant charging	<input type="checkbox"/> 	As pressure is high and gasification speed is fast, it is difficult to read the indicated value by means of charging cylinder, as air bubbles occur.
Torque wrench (nominal diam. 1/2, 5/8)	<input checked="" type="checkbox"/> 	The size of opposite sides of flare nuts have been increased. Incidentally, a common wrench is used for nominal diameters 1/4 and 3/8.
Flare tool (clutch type)	<input type="checkbox"/> 	By increasing the clamp bar's receiving hole, strength of spring in the tool has been improved.
Gauge for projection adjustment	—	Used when flare is made with using conventional flare tool.
Vacuum pump adapter	<input type="checkbox"/> 	Connected to the conventional vacuum pump. It is necessary to use an adapter to prevent vacuum pump oil from flowing back to the charge hose. The charge hose connecting part has two ports—one for conventional refrigerant (7/16 UNF 20 threads per inch) and one for R410A. If the vacuum pump oil (mineral) mixes with R410A a sludge may occur and damage the equipment.
Gas leakage detector	<input checked="" type="checkbox"/> 	Exclusive for HFC refrigerant.

- Incidentally, the “refrigerant cylinder” comes with the refrigerant designation (R410A) and protector coating in the U.S.’s ARI specified rose color (ARI color code: PMS 507).
- Also, the “charge port and packing for refrigerant cylinder” require 1/2 UNF 20 threads per inch corresponding to the charge hose’s port size.

ACCESSORIES (SOLD SEPARATELY)

Remote controller



PRECAUTIONS FOR SAFETY

WARNING

WARNINGS ABOUT INSTALLATION

- Make sure to ask the qualified installation professional in electric work to install the air conditioner.
If the air conditioner is inappropriate installed by yourself, it may cause water leak, electric shock, fire, and so on.
- Be sure to provide grounding.
Do not connect ground wires to gas pipes, water pipes, lightning rods or ground wires for telephone cables.

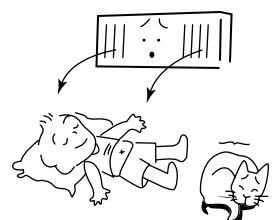


CAUTION

TO DISCONNECT THE APPLIANCE FROM THE MAINS SUPPLY

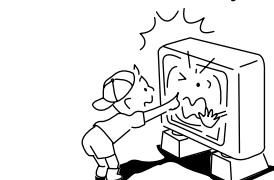
This appliance must be connected to the mains by means of a switch with a contact separation of at least 3 mm.

The installation fuse (25A D type ) must be used for the power supply line of this conditioner.



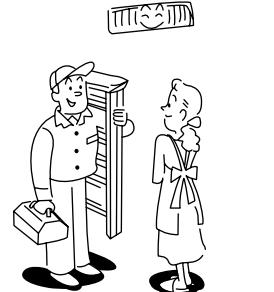
WARNINGS ABOUT OPERATION

- Cleaning of the air filter and other parts of the air filter involves dangerous work in high places, so be sure to have a service person do it. Do not attempt it yourself. The cleaning diagram for the air filter is there for the service person, and not for the customer.
- Avoid cooling the room too strong or exposing the human body to cool breeze for a long time as it is bad for the health.
- When you notice something abnormal with the air conditioner (smells like something scorching, poor cooling, etc.), immediately turn off the main switch, the circuit breaker, from the mains to stop the air conditioner, and contact the dealer. If the air conditioner is continuously operated with something abnormal, it may cause machine failure, electric shock, fire, and so on.



WARNINGS ABOUT MOVEMENT AND REPAIR

- Do not move or repair any unit by yourself.
Since there is high voltage inside the unit, you may get electric shock when removing the cover and main unit.
- Whenever the air conditioner needs repair, make sure to ask the dealer to do it. If it is repaired imperfectly, it may cause electric shock or fire.
- When moving the air conditioner for re-installing at another place, ask the dealer to do it. If it is imperfectly installed, it may cause electric shock or fire.

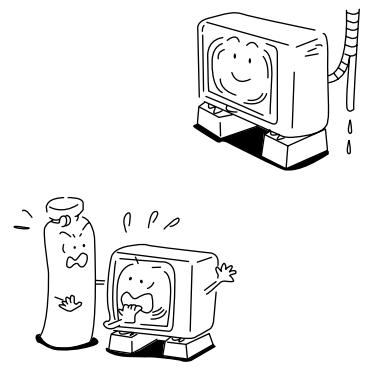


RAV-SM561BT-E/RAV-SM801BT-E
RAV-SM1101BT-E/RAV-SM1401BT-E

CAUTION

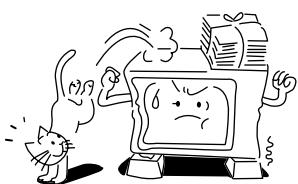
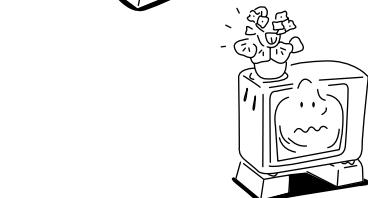
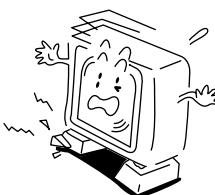
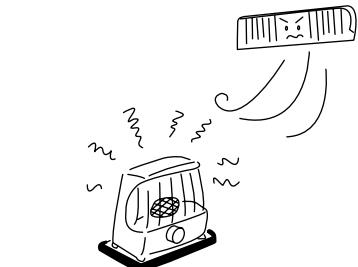
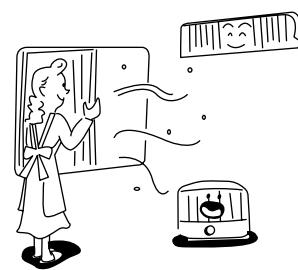
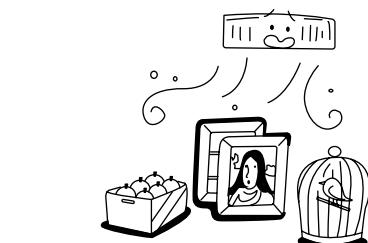
CAUTIONS ABOUT INSTALLATION

- Be sure to confirm the following cautions.
- Certainly lay the drain hose for perfect draining.
Bad drainage may cause flooding in the house and getting furniture wet.
- Make sure to connect the air conditioner to an exclusive power supply of the rated voltage, otherwise the unit may break down or cause a fire.
- Do not install the unit in a place where inflammable gas may leak.
If inflammable gas accumulates around the unit, it may cause a fire.



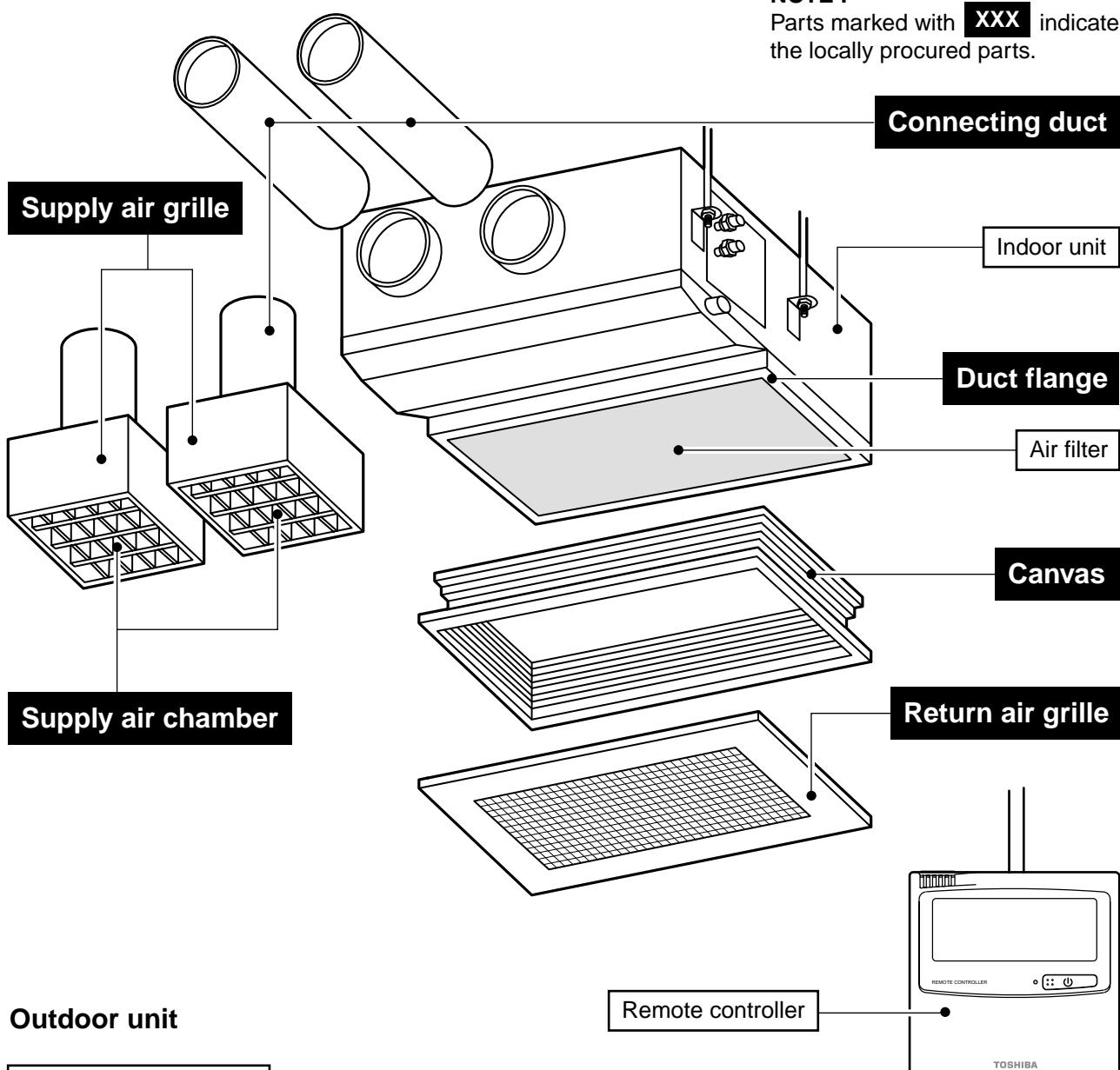
CAUTIONS ABOUT OPERATION

- Carefully read this manual before starting the air conditioner. There are many important things to keep in mind for daily operation.
- Do not use this air conditioner for special purposes such as preserving food, precision instruments, art objects, breeding animals, growing potted plants, etc.
- Avoid exposing potted plants and animals to the wind of the air conditioner, since it badly affects the health and growth of them.
- When the air conditioner is operated with a combustion appliance in the same place, be careful of ventilation to let fresh air enter the room.
Poor ventilation causes oxygen shortage.
- Do not place any combustion appliance in a place where it is directly exposed to the wind of air conditioner, otherwise it may cause imperfect combustion.
- When the air conditioner is used in a closed room, be careful of sufficient ventilation of the room. Poor ventilation causes oxygen shortage.
- Do not touch any switches with wet finger, otherwise you may get an electric shock.
- If the air conditioner won't be used for a considerably long time, turn off the main switch or the circuit breaker, for safety.
- Check the concrete blocks, etc. of the base of the outdoor unit occasionally.
If the base is left damaged or deteriorated, the unit may topple over and inflict an injury to a person as the worst case.
- Do not put anything on the outdoor unit nor step onto it. If you do so, it may not only topple over the unit but also injure yourself.
- To make the air conditioner operate in its original performance, operate it within the range of the operating temperature specified in the instructions.
Otherwise it may cause a malfunction, or water leak from the unit.
- Prevent any liquid from falling into the remote controller. Do not spill juice, water or any kind of liquid.

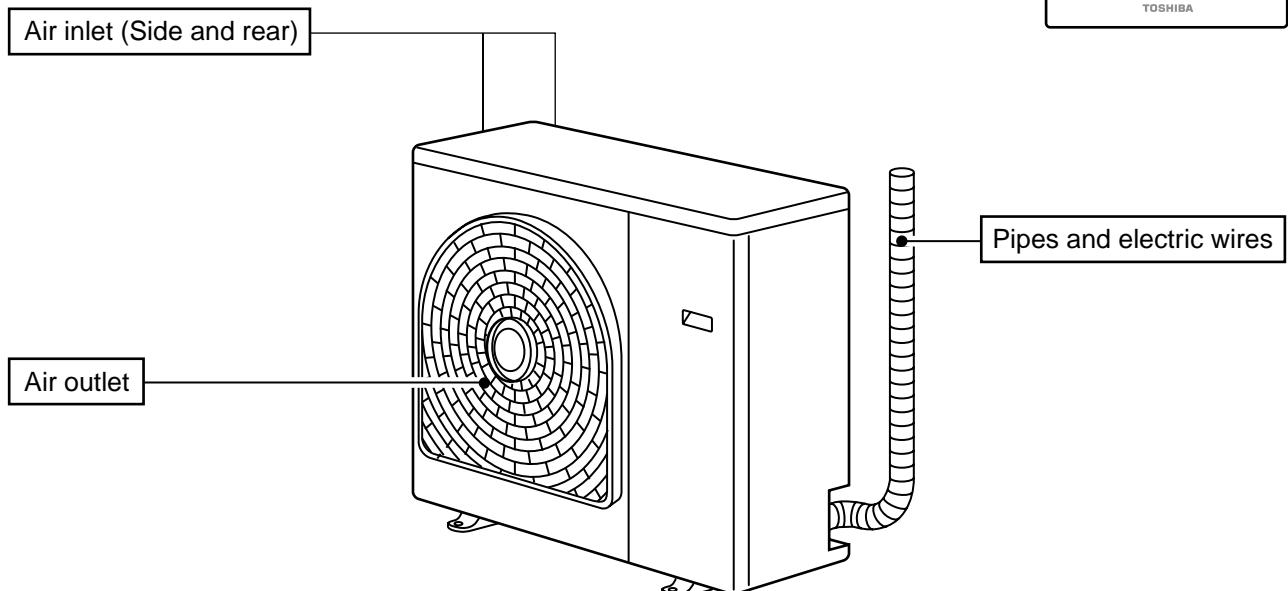


PARTS NAME

Indoor unit



Outdoor unit



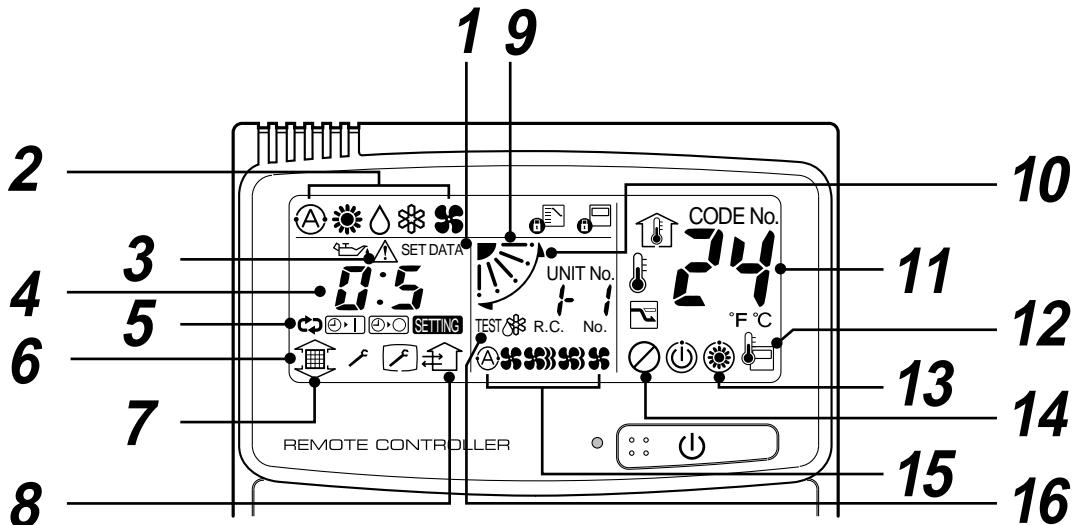
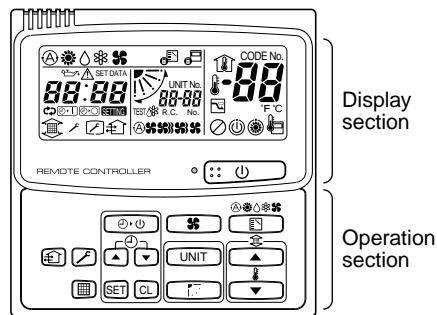
PARTS NAME OF REMOTE CONTROLLER

Display section

All display items are shown in right figure for the explanation.

Only selected contents are displayed in actual operation.

- When turning on the leakage breaker at the first time, **[SET DATA]** flashes on the display part of the remote controller. While this display is flashing, the model is being automatically confirmed. Accordingly, wait for a while after **[SET DATA]** display has disappeared, and then use the remote controller.



1 SET DATA display

Displayed during setup a timer.

2 Operation mode display

The selected operation mode is displayed.

3 CHECK display

Displayed while the protective device works or a trouble occurs.

4 Timer time display

Set time by the timer is displayed.
(When a trouble occurs, the check code is displayed.)

5 Timer SETIN setup display

When pushing the Timer SET button, the display of the timer is selected in order of
[OFF] → [OFF] repeat OFF timer
→ [ON]
 → No display.

6 Filter display

If "FILTER" is displayed, clean the air filter.

7 UP/DOWN grille display

8 Ventilator operation display

9 Flap position display

10 SWING display

Displayed during up/down movement of the flap.

11 Set up temperature display

The selected set up temp. is displayed.

12 Remote controller sensor display

Displayed while the sensor of the remote controller is working.

13 PRE-HEAT display

Displayed when the heating operation starts or defrost operation is carried out.

While this indication is displayed, the indoor fan stops or the mode changes in LOW.

14 No function display

Displayed if there is no function even if the button is pushed.

15 Fan mode display

The selected fan mode is displayed.

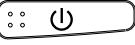
(AUTO)	
(HIGH)	
(MED.)	
(LOW)	

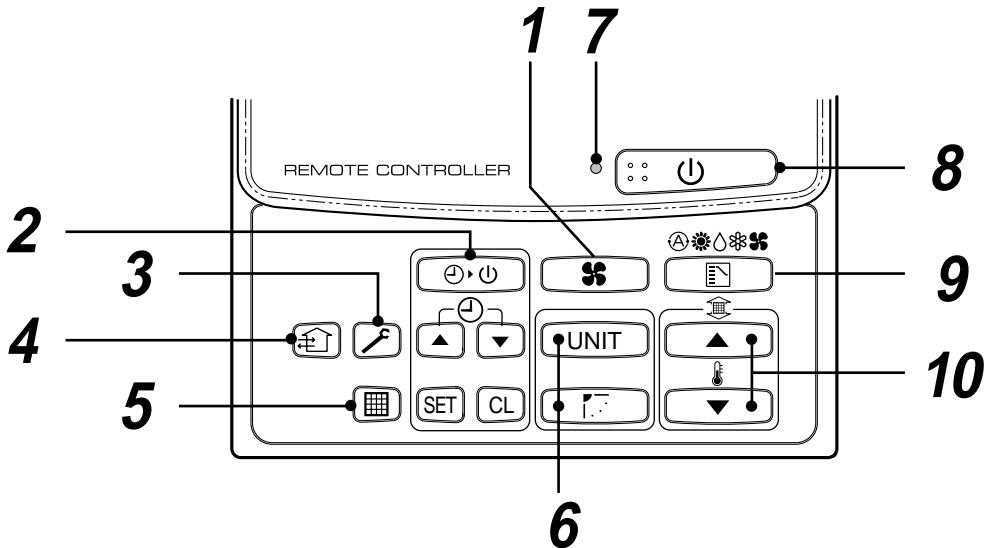
16 TEST run display

Displayed during a test run.

Operation section

Push each button to select a desired operation.

- The details of the operation needs to be set up once, the same states are used by pushing  button.



1 Fan mode button

Selects a fan mode.

2 Timer set button

TIMER SET button is used when the timer is set up.

3 Check button

CHECK button is used for check operation. During normal operation, do not use this button.

4 Fan button

FAN button is used when a fan which is sold on the market or etc. is connected.

- If "No function" is displayed on the remote controller when pushing the FAN button, a fan is not connected.

5 Filter reset button

Resets (Erases) "FILTER"  display.

6 UNIT and AUTO flap button

No function

7 Operation lamp

Lamp is lit during the operation. Lamp is off when stopped.

It flashes when operating a protection device or abnormal occurred.

8 button

When the button is pushed, operation starts, and it stops by pushing the button again.

When the operation stops, the operation lamp and all displays disappear.

9 Operation select button

Selects operation mode.

10 Set up temperature button

Adjusts required room temperature.

Set required set temperature by pushing  or .

FILTER UP/DOWN button

(No function display)

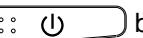
OPTION :

Remote controller sensor

Usually the TEMP. sensor of the indoor unit measures a temperature. A temperature around the remote controller can also be measured.

For details, contact the dealer from which you have purchased the air conditioner.

CORRECT USAGE

When you use the air conditioner for the first time or when you change SET DATA value, follow the procedure below. From the next time, the operation will start as set state by pushing the  button.

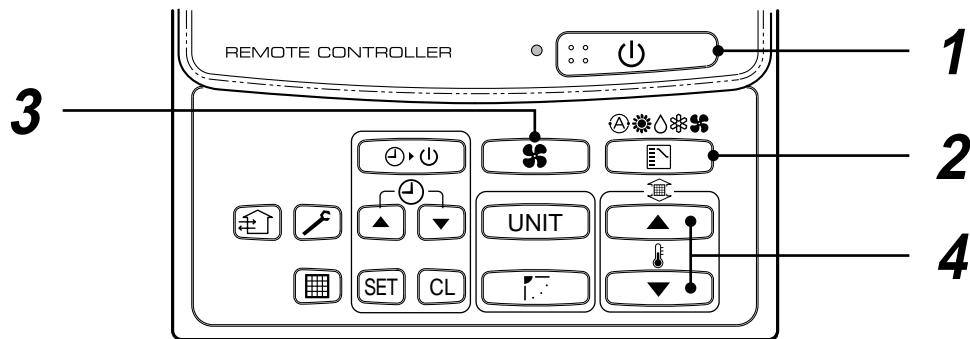
Preparation

Turn on the main power switch and/or the leakage breaker.

- When the power supply is turned on, display section is displayed on the remote controller.
- * After the power supply is turned on, the remote controller does not accept an operation for approx. 1 minute, but it is not a failure.

REQUIREMENT

- While using the air conditioner, operate it only with  button without turning off the main power switch and the leakage breaker.
- When starting the operation after stop for a long time, turn on the main power switch for 12 hours or more before start. (This is required to turn on the compressor case heater for warming in order to prevent overload on the compressor when activating the outdoor unit.)

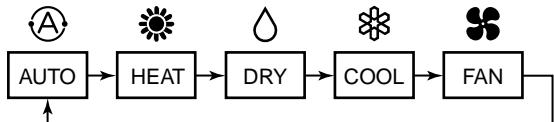


1 Push button.

The operation lamp goes on, and the operation starts.

2 Select an operation mode with the “MODE” button.

One push of the button, in each time the display changes in the order shown on the right.

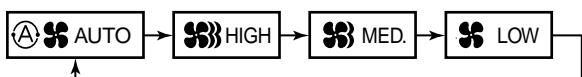


- In HEAT  mode, if the room temperature reaches to the set temperature, the outdoor unit stops and the air flow becomes LOW and the air volume decreases.

- In the defrost mode, the fan stops so that cool air is not discharged and PRE-DEF  is displayed.

3 Select air volume with “FAN ” button.

One push of the button, in each time the display changes in the order shown on the right.



- When air volume is “AUTO ”, air volume differs according to the room temperature.
- In DRY  mode, “AUTO ” is displayed and the air volume is LOW.
- In heating operation, if the room temperature is not heated sufficiently with fan mode “LOW ” operation, select “MED. ” or “HIGH ” operation.

4 Determine the set up temperature by pushing the “TEMP. ” or “TEMP. ” button.

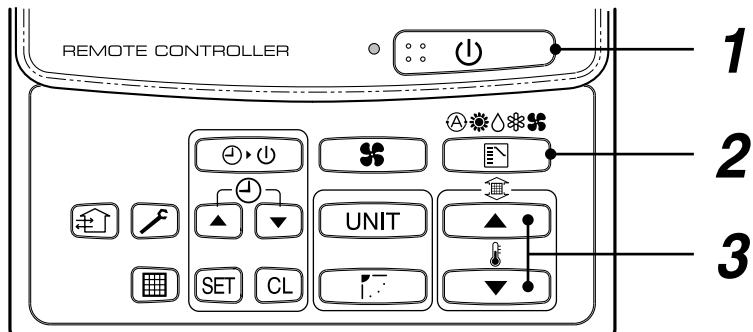
Stop

Push button.

The operation lamp goes off, and the operation stops.

AUTOMATIC OPERATION (Auto Changeover)

When you set the air conditioner in \textcircled{A} mode or switch over from AUTO operation, it will automatically select either cooling, heating, or fan only operation depending on the indoor room temperature.



Start

1 $\textcircled{::} \textcircled{\text{P}}$ button

Push this button to start the air conditioner.

2 Mode select button (MODE)

Select Auto.

3 Temperature button

Set the desired temperature.

- In case of cooling, start the operation after approx. 1 minute.
- In case of heating, starts the operation after approximately 3 to 5 minutes.
- When you select the Auto mode, it is unnecessary to set the fan speed. The fan speed display will show \textcircled{A} and fan speed will be automatically controlled.
- After heating operation stops, FAN operation may continue for approx. 30 seconds.
- When the room temperature reaches the set temperature and the outdoor unit stops, the LOW wind is discharged and the air volume decreases excessively. During defrost operation, the fan stops so that cool air is not discharged and \textcircled{W} is displayed.
- If the Auto mode is uncomfortable, you can select the desired conditions manually.

NOTE

When restarting the operation after stop

- When restarting the operation immediately after stop, the air conditioner does not operate for approx. 3 minutes to protect a compressor.

Stop

Push $\textcircled{::} \textcircled{\text{P}}$ button.

Push this button again to stop the air conditioner.

TIMER OPERATION

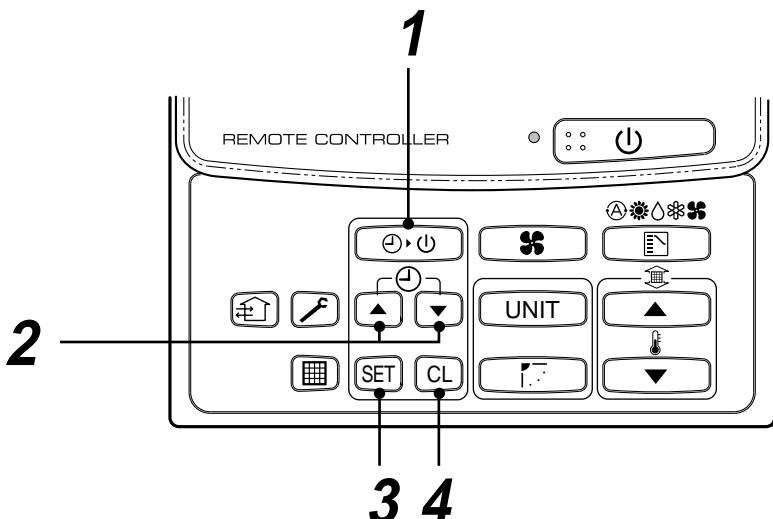
A type of timer operation can be selected from the following three types.

OFF timer : The operation stops after the set time has passed.

Repeat OFF timer : Every time, the operation stops after the set time has passed.

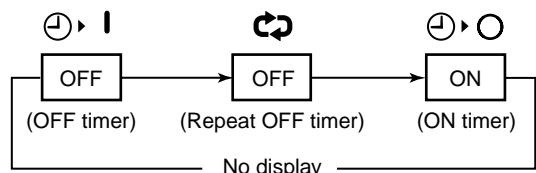
ON timer : The operation starts after the set time has passed.

Timer operation



1 Push TIMER SET button.

- The timer display (type) changes every push of the button.
- SET TIME and $\textcircled{\text{P}}\text{ }\textcircled{\text{O}}$, $\textcircled{\text{P}}$, $\textcircled{\text{O}}$, $\textcircled{\text{C}}$ display flashes.



2 Push $\textcircled{\text{P}}\text{ }\textcircled{\text{A}}$ to select "SET TIME".

For every push of $\textcircled{\text{A}}$ button, the set time increases in the unit of 0.5 hr (30 minutes).

The maximum set time is 72.0 hr.

For every push of $\textcircled{\text{D}}$ button, the set time decreases in the unit of 0.5 hr (30 minutes).

The minimum set time is 0.5 hr.

3 Push SET button.

- SET TIME display disappears and timer time display goes on.

(When ON timer is activated, timer time are displayed, ON timer $\textcircled{\text{P}}\text{ }\textcircled{\text{I}}$ and SETTING other displays are disappear.)

Clear of timer operation

4 Push CL button.

- TIMER display disappears.

NOTICE

- Once set "Repeat OFF timer" resumes. So start again, stop by same timer.
For cancel timer, push CL button.

HINTS FOR ECONOMICAL OPERATION

Maintain room temperature at comfortable level

Clean air filters

Airflow and performance are reduced if the air filters become blocked.

Do not open doors and windows more often than necessary

To keep cool or warm air in the room, do not open doors and windows more often than necessary.

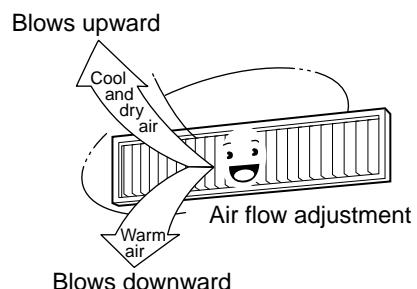
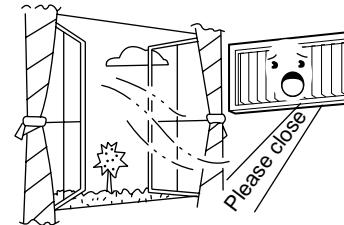
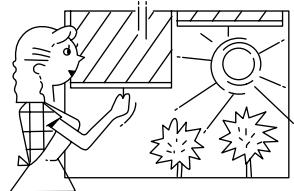
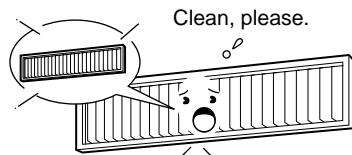
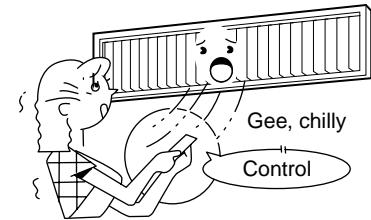
Window curtains

In cooling, close the curtains to avoid direct sunlight.

In heating, close the curtains to keep the heat in.

Get uniform circulation of room air

Adjust the air flow direction for the even circulation of room air.

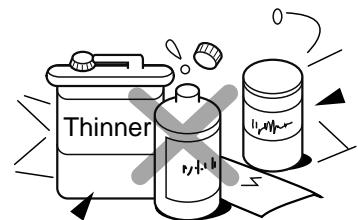


MAINTENANCE

Cleaning of remote controller

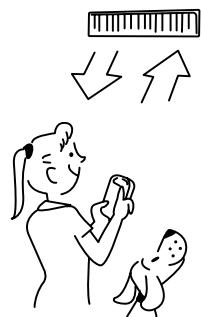
CAUTION

- Use a dry cloth to wipe the remote controller.
- A cloth dampened with cold water may be used on the indoor unit if it is very dirty.
- Never use a damp cloth on the remote controller.
- Do not use a chemically-treated duster for wiping or leave such materials on the unit for long. It may damage or fade the surface of the unit.
- Do not use benzine, thinner, polishing powder, or similar solvents for cleaning. These may cause the plastic surface to crack or deform.



If you do not plan to use the unit for more than 1 month

- (1) Operate the fan for 3 to 4 hours to dry inside the unit
Operate "FAN ONLY" mode with set temperature 30°C.
- (2) Stop the air conditioner and turn off the main power switch or the circuit breaker.



FAN ONLY operation

Checks before operation

- (1) Check that the air filters are installed.
- (2) Check that the air outlet or inlet is not blocked.
- (3) Turn on the main power switch or the circuit breaker for the main power supply to the air conditioner.

WARNING

Cleaning of the air filter and other parts of the air filter involves dangerous work in high places, so be sure to have a service person do it. Do not attempt it yourself.

NOTE

For Air conditioning system which is operated regularly, cleaning and maintenance of the indoor/outdoor units are strongly recommended.
As a general rule, if an indoor unit is operated for about 8 hours daily, the indoor/outdoor units will need to be cleaned at least once every 3-MONTH. This cleaning and maintenance shall be carried out by a qualified person.
Failure to clean the indoor/outdoor units regularly will result in poor performance, icing, water leaking and even compressor failure.

AIR CONDITIONER OPERATIONS AND PERFORMANCE

3 minutes protection function

3-minutes protection function prevents the air conditioner from starting for initial 3 minutes after the main power switch/circuit breaker is turned on for re-starting the air conditioner.

Power failure

Power failure during operation will stop the unit completely.

- To restart the operation, push the START/STOP button on the remote controller.
- Lightning or a wireless car telephone operating nearby may cause the unit to malfunction. Turn off the main power switch or circuit breaker and then turn them on again. Push the START/STOP button on the remote controller to restart.

Heating characteristics

Preheating operation

The air conditioner will not deliver warm air immediately after it is turned on. Warm air will start to flow out after approximately 5 minutes when the indoor heat exchanger warmed up.

Warm air control (In heating operation)

When the room temperature reaches the set temperature, the fan speed is automatically reduced to prevent to blow cold draft. At this time, the outdoor unit will stop.

Defrosting operation

If the outdoor unit is frosted during the heating operation, defrosting starts automatically (for approximately 2 to 10 minutes) to maintain the heating capacity.

- The fans in both indoor and outdoor units will stop during the defrosting operation.
- During the defrosting operation, the defrosted water will be drained from the bottom plate of the outdoor unit.

Heating capacity

In the heating operation, the heat is absorbed from the outside and brought into the room. This way of heating is called heat pump system. When the outside temperature is too low, it is recommended to use another heating apparatus in combination with the air conditioner.

Attention to snowfall and freeze on the outdoor unit

- In snowy areas, the air inlet and air outlet of the outdoor unit are often covered with snow or frozen up. If snow or freeze on the outdoor unit is left as it is, it may cause machine failure or poor warming.
- In cold areas, pay attention to the drain hose so that it perfectly drains water without water remaining inside for freeze prevention. If water freezes in the drain hose or inside the outdoor unit, it may cause machine failure or poor warming.

Air conditioner operating conditions

For proper performance, operate the air conditioner under the following temperature conditions:

Cooling operation	Outdoor temperature	: -5°C to 43°C
	Room temperature	: 21°C to 32°C (Dry valve temp.), 15°C to 24°C (Wet valve temp.)
	CAUTION Room relative humidity – less than 80 %. If the air conditioner operates in excess of this figure, the surface of the air conditioner may cause dewing.	
Dry operation	Outdoor temperature	: 15°C to 43°C (Maximum suction air temp. 46°C)
	Room temperature	: 17°C to 32°C
Heating operation	Outdoor temperature	: -15°C to 15°C (Wet valve temp.)
	Room temperature	: 15°C to 28°C (Dry valve temp.)

If air conditioner is used outside of the above conditions, safety protection may work.

RE-INSTALLATION

DANGER

Ask the dealer or an installation professional to re-install the air conditioner to a new place or move it to another place and to observe the following items.

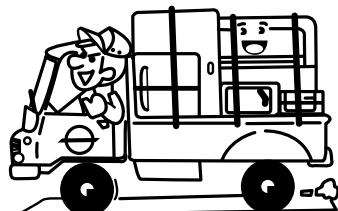
If the air conditioner is inappropriate installed by yourself, it may cause electric shock or fire.

Do not install the air conditioner in the following places

- Do not install the air conditioner in any place within 1 m from a TV, stereo, or radio set. If the unit is installed in such place, noise transmitted from the air conditioner affects the operation of these appliances.
- Do not install the air conditioner near a high frequency appliance (sewing machine or massager for business use, etc.), otherwise the air conditioner may malfunction.
- Do not install the air conditioner in a humid or oily place, or in a place where steam, soot, or corrosive gas is generated.
- Do not install the air conditioner in a salty place such as seaside area.
- Do not install the air conditioner in a place where a great deal of machine oil is used.
- Do not install the air conditioner in a place where it is usually exposed to strong wind such as in seaside area or on the roof or upper floor of a building.
- Do not install the air conditioner in a place where sulfureous gas generated such as in a spa.
- Do not install the air conditioner in a vessel or mobile crane.

Be careful with noise or vibrations

- Do not install the air conditioner in a place where noise by outdoor unit or hot air from its air outlet annoys your neighbors.
- Install the air conditioner on a solid and stable foundation so that it prevents transmission of resonating, operation noise and vibration.
- If one indoor unit is operating, some sound may be audible from other indoor units that are not operating.



TROUBLES AND CAUSES

CAUTION

If any of the following conditions occur, turn off the main power supply switch and immediately contact the dealer :

- The operation lamps flash at short intervals (5 Hz) even though you have tried turning off the power supply and turning on again after 2 or 3 minutes.
- Switch operation does not work properly.
- The main power fuse often blows out, or the circuit breaker is often activated.
- A foreign matter or water fall inside the air conditioner.
- Any other unusual conditions are observed.

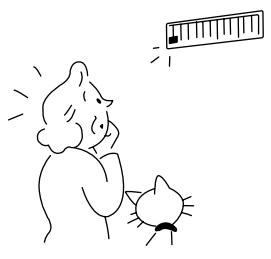
Before you ask for servicing or repairs, check the following points.

Recheck

These are not failures.

Inoperative

- The main power switch is turned off.
- The circuit breaker is activated to cut off power supply.
- The main power fuse has blown out.
- Stoppage of electric current.



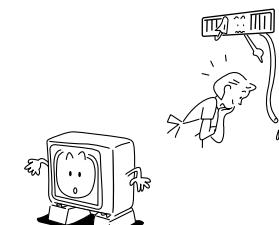
Does not cool well or heat well

- The air inlet and/or outlet of the outdoor unit is blocked.
- Doors or windows are opened.
- The fan speed is set to low.
- The air conditioner is set in the DRY mode.
- The set temperature is too high. (In cooling operation)
- The set temperature is too low. (In heating operation)



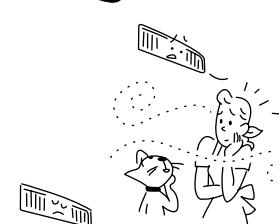
Indoor unit or outdoor unit makes a strange noise.

- When the temperature suddenly changes, the indoor or outdoor unit occasionally makes a strange noise because of changing of refrigerant flow or expansion work.



The room air is smelly or a bad odor comes from the air conditioner.

- Smells impregnated in the walls, carpets, furniture, clothing, or furs, come out from the air conditioner.



Outdoor unit is frosted in heating operation.

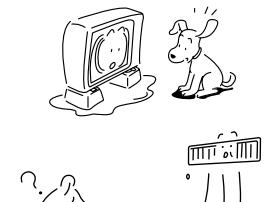
Water drains from outdoor unit.

- The outdoor unit is sometimes frosted in heating operation. In that case, the unit automatically performs defrosting (for 2 to 10 minutes) for increasing the heating efficiency.
- In defrosting operation, both the indoor and outdoor units stop air flow.
- Hiss sound is heard when flow of the refrigerant is changed for defrosting.
- Resultant water of automatic defrosting in heating operation drains from outdoor unit.



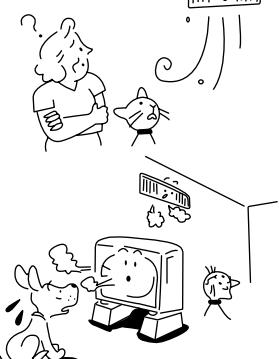
Air flow changes without FAN button set to AUTO mode.

- When the temperature of blown air drops in heating operation, the air conditioner automatically changes or stops air flow from the indoor unit not to make persons in the room feel chilly.
- Air flow of the indoor unit is occasionally changed in the cooling operation.



A white mist of chilled air or water is generated from the outdoor unit.

- The indoor unit in cooling operation or the outdoor unit in defrosting operation occasionally cause steams.



TROUBLES AND CAUSES (Concerning Remote Controller)

Before you ask for servicing or repairs, check the following points:

Setting Change is Impossible

Symptoms	Causes	Reason and Disposal
The fan speed can not be changed.	<ul style="list-style-type: none">Check whether the MODE indicated on the display is "AUTO". AUTO 	When the automatic mode is selected, the air conditioner automatically selects the fan speed.
	<ul style="list-style-type: none">Check whether the MODE indicated on the display is "DRY". (DRY) 	When dry operation is selected, the air conditioner automatically selects the fan speed.

Accessory parts and Parts to be procured locally

□ Accessory parts

Part name	Q'ty	Shape
Pipe insulator	2	
Clamp for air filter fixing	561BT 801BT 1101BT 1401BT	2 4
Washer for unit hung-up	8	

Part name	Q'ty	Shape
Clamp screw	561BT	2
	801BT 1101BT 1401BT	4
Connecting cable for High static pressure tap		
Installation Manual	1	
Owner's Manual	1	

<Separate sold parts>

Part name	Q'ty	Shape
Standard wired remote controller	1	

□ Parts to be procured locally

Connecting pipe (Liquid side) (6.4mm (diam.), Nominal (diam.) 1/4" thick 0.8mm) RAV-SM561BT, RAV-SM560AT
(9.52mm (diam.), Nominal (diam.) 3/8" thick 0.8mm) RAV-SM801BT, RAV-SM800AT
RAV-SM1101BT, RAV-SM1100AT
RAV-SM1401BT, RAV-SM1400AT
Connecting pipe (Gas side) (12.7mm (diam.), Nominal (diam.) 1/2" thick 0.8mm) RAV-SM561BT, RAV-SM560AT
(15.9mm (diam.), Nominal (diam.) 5/8" thick 1.0mm) RAV-SM801BT, RAV-SM800AT
RAV-SM1101BT, RAV-SM1100AT
RAV-SM1401BT, RAV-SM1400AT
Power supply cord 2.5mm ² (H07RN-F or 245IEC66) (20m or less), 3.5mm ² (AWG-12) (50m or less)

Connecting cable H07RN-F or 245IEC66 (1.5mm ² or more)
Thermal insulation for refrigerant pipe (10mm or more, thermal insulating foam polyethylene)
Thermal insulation for drain pipe (10mm or more, foam polyethylene)
Drain pipe (Outer 32mm (diam.)) (VP25)
Tapes
Grounding cable (2.0mm (diam.) or more)

RAV-SM561BT-E/RAV-SM801BT-E
RAV-SM1101BT-E/RAV-SM1401BT-E

1 PRECAUTIONS FOR SAFETY

- Ensure that all Local, National and International regulations are satisfied.
- Read this "PRECAUTIONS FOR SAFETY" carefully before Installation.
- The precautions described below include the important items regarding safety. Observe them without fail.
- After the installation work, perform a trial operation to check for any problem.
Follow the Owner's Manual to explain how to use and maintain the unit to the customer.
- Turn off the main power supply switch (or breaker) before the unit maintenance.
- Ask the customer to keep the Installation Manual together with the Owner's Manual.

CAUTION

New Refrigerant Air Conditioner Installation

- **THIS AIR CONDITIONER ADOPTS THE NEW HFC REFRIGERANT (R410A) WHICH DOES NOT DESTROY OZONE LAYER.**

The characteristics of R410A refrigerant are ; easy to absorb water, oxidizing membrane or oil, and its pressure is approx. 1.6 times higher than that of refrigerant R22. Accompanied with the new refrigerant, refrigerating oil has also been changed. Therefore, during installation work, be sure that water, dust, former refrigerant, or refrigerating oil does not enter the refrigerating cycle.

To prevent charging an incorrect refrigerant and refrigerating oil, the sizes of connecting sections of charging port of the main unit and installation tools are charged from those for the conventional refrigerant.

Accordingly the exclusive tools are required for the new refrigerant (R410A).

For connecting pipes, use new and clean piping designed for R410A, and please care so that water or dust does not enter. Moreover, do not use the existing piping because there are problems with pressure-resistance force and impurity in it.

CAUTION

To Disconnect the Appliance from Main Power Supply.

This appliance must be connected to the main power supply by means of a switch with a contact separation of at least 3 mm.

The installation fuse (25A D type ) must be used for the power supply line of this conditioner.



WARNINGS

- **Ask an authorized dealer or qualified installation professional to install/maintain the air conditioner.**
Inappropriate installation may result in water leakage, electric shock or fire.
- **Turn off the main power supply switch or breaker before attempting any electrical work.**
Make sure all power switches are off. Failure to do so may cause electric shock.
- **Connect the connecting cable correctly.**
If the connecting cable is connected in a wrong way, electric parts may be damaged.
- **When moving the air conditioner for the installation into another place, be very careful not to enter any gaseous matter other than the specified refrigerant into the refrigeration cycle.**
If air or any other gas is mixed in the refrigerant, the gas pressure in the refrigeration cycle becomes abnormally high and it may resultingly causes pipe burst and injuries on persons.
- **Do not modify this unit by removing any of the safety guards or by bypassing any of the safety interlock switches.**
- **Exposure of unit to water or other moisture before installation may cause a short-circuit of electrical parts.**
Do not store it in a wet basement or expose to rain or water.

- After unpacking the unit, examine it carefully if there are possible damage.
- Do not install in a place that might increase the vibration of the unit.
- To avoid personal injury (with sharp edges), be careful when handling parts.
- Perform installation work properly according to the Installation Manual.
Inappropriate installation may result in water leakage, electric shock or fire.
- When the air conditioner is installed in a small room, provide appropriate measures to ensure that the concentration of refrigerant leakage occur in the room does not exceed the critical level.
- Install the air conditioner securely in a location where the base can sustain the weight adequately.
- Perform the specified installation work to guard against an earthquake.
If the air conditioner is not installed appropriately, accidents may occur due to the falling unit.
- If refrigerant gas has leaked during the installation work, ventilate the room immediately.
If the leaked refrigerant gas comes in contact with fire, noxious gas may generate.
- After the installation work, confirm that refrigerant gas does not leak.
If refrigerant gas leaks into the room and flows near a fire source, such as a cooking range, noxious gas might generate.
- Electrical work must be performed by a qualified electrician in accordance with the Installation Manual. Make sure the air conditioner uses an exclusive power supply.
An insufficient power supply capacity or inappropriate installation may cause fire.
- Use the specified cables for wiring connect the terminals securely fix. To prevent external forces applied to the terminals from affecting the terminals.
- Conform to the regulations of the local electric company when wiring the power supply.
Inappropriate grounding may cause electric shock.
- Do not install the air conditioner in a location subject to a risk of exposure to a combustible gas.
If a combustible gas leaks, and stays around the unit, a fire may occur.

2 SELECTION OF INSTALLATION PLACE



WARNING

- **Install the air conditioner at enough strong place to withstand the weight of the unit.**

If the strength is not enough, the unit may fall down resulting in injury.

- **Install the air conditioner at a height 2.5m or more from the floor.**

If you insert your hands or others directly into the unit while the air conditioner operates, it is dangerous because you may contact with revolving fan or active electricity.



CAUTION

- **Do not install the air conditioner in a location subject to a risk of exposure to a combustible gas.**

If a combustible gas leaks and stays around the unit, a fire may occur.

Upon approval of the customer, install the air conditioner in a place that satisfies the following conditions.

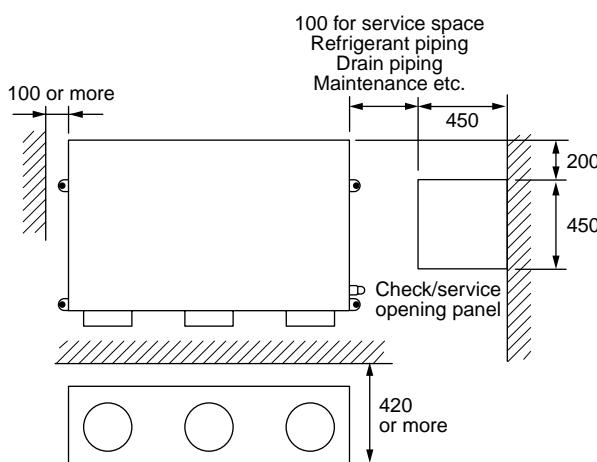
- Place where the unit can be installed horizontally.
- In the process after removing the ceiling panel, it is important to reinforce the groundwork (framework) and keep a level correctly of the existing ceiling to prevent vibration of the ceiling panel.
- Place where a sufficient servicing space can be ensured for safety maintenance and check.
- Place where drained water will not cause any problem.

Avoid installing in the following places.

- Place exposed to air with high salt content (seaside area), or place exposed to large quantities of sulfide gas (hot spring). (Should the unit be used in these places, special protective measures are needed.)
- Place exposed to oil, vapor, oil smoke or corrosive gas.
- Place where organic solvent is used nearby.
- Place close to a machine generating high frequency.
- Place where the discharged air blows directly into the window of the neighboring house. (For outdoor unit)
- Place where noise of the outdoor unit is easily transmitted.
(When installing the air conditioner on the boundary with the neighbor, pay due attention to the level of noise.)
- Place with poor ventilation. (Before air ducting work, check whether value of air volume, static pressure and duct resistance are correct.)

Installation space

Secure the space required to installation and servicing.



Selection of installation place

In case of continued operation of the indoor unit under high-humidity conditions as described below, dew may condense and water may drop.

Especially, high-humidity atmosphere (dew point temperature : 23°C or more) may generate dew inside the ceiling.

1. Unit is installed inside the ceiling with slated roof.
2. Unit is installed at a location using inside of the ceiling as fresh air take-in path.
3. Kitchen

If installing a unit at such place, adhere insulating material (glass wool, etc.) additionally over all the positions of the indoor unit which come to contact with high-humidity atmosphere.

Advice

Set a check service opening panel at right side of the unit (size: 450 x 450mm) for piping, maintenance, and servicing.

3 INSTALLATION OF INDOOR UNIT

⚠ WARNING

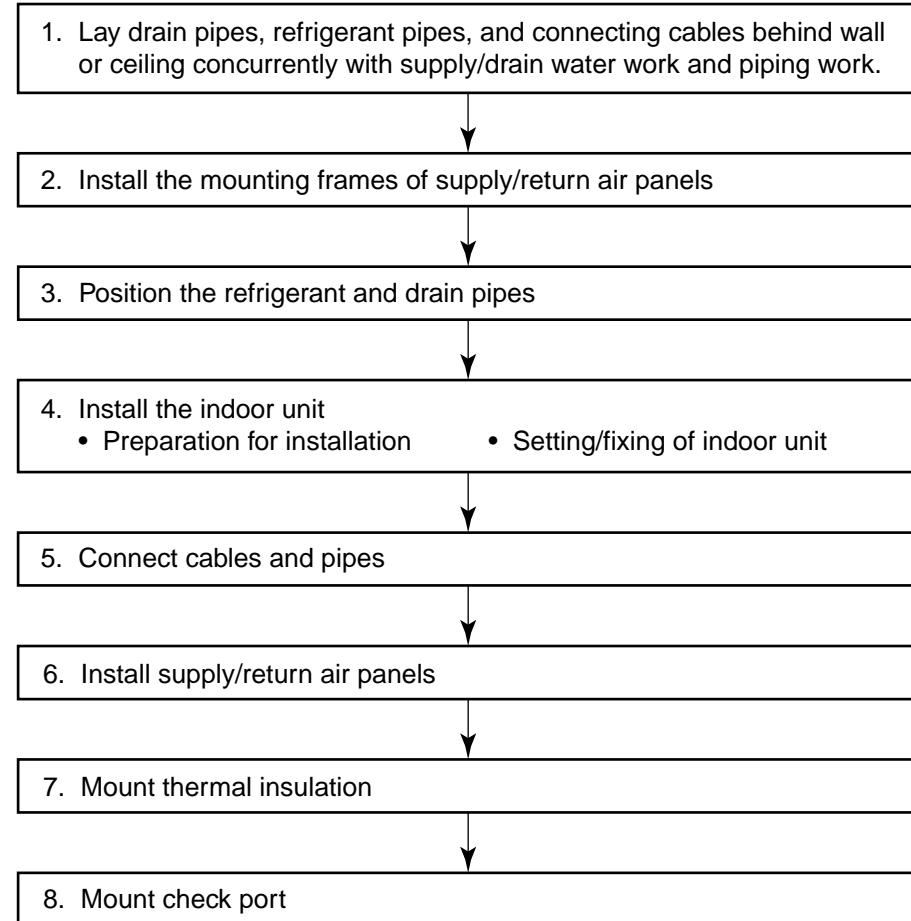
Install the air conditioner certainly at a place to sufficiently withstand the weight.

If the strength is insufficient, the unit may fall down resulting in human injury.

Perform a specified installation work to guard against an earthquake.

An incomplete installation can cause accidents by the units falling and dropping.

Installation procedure

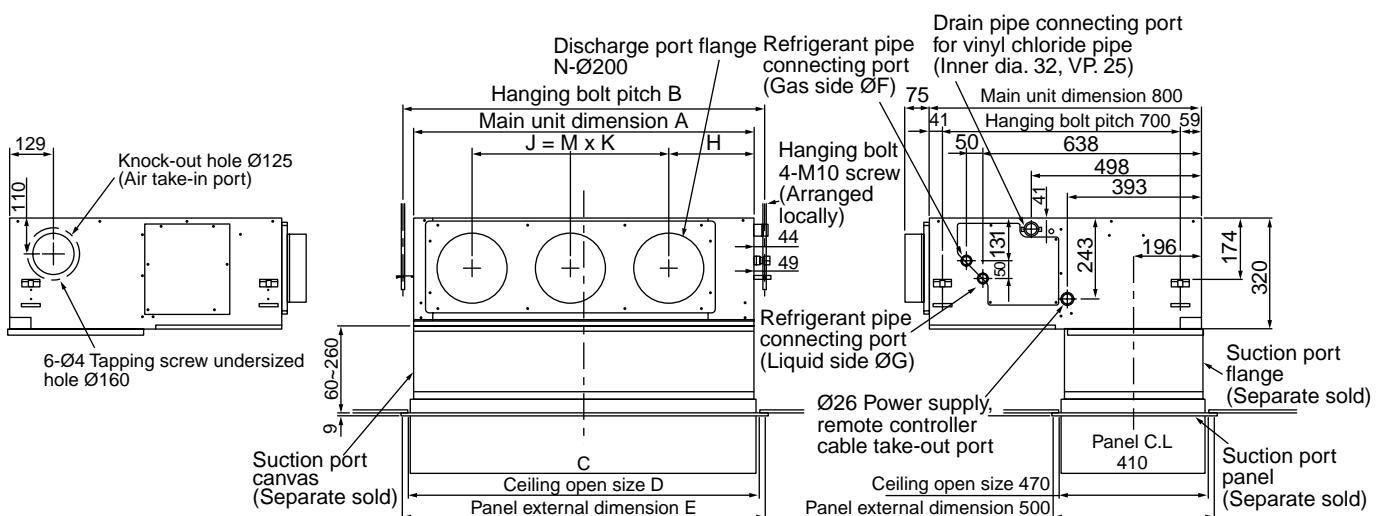


3 INSTALLATION OF INDOOR UNIT

External view

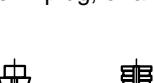
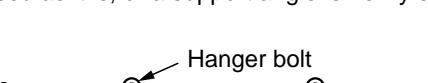
REQUIREMENT

The hanging bolt pitch on horizontal direction (B) is not halved at center with the ceiling opening size. Therefore, check the relational position in the following figure.



- Dimension

	A	B	C	D	E	F	G	H	J	K	M	N
RAV-SM561BT	700	766	690	750	780	12.7	6.4	252	280	280	1	2
RAV-SM801BT	1000	1066	990	1050	1080	15.9	9.5	252	580	290	2	3
RAV-SM1101, 1401BT	1350	1416	1340	1400	1430	15.9	9.5	252	930	310	2	4

In case of concrete slab	In case of steel structure
<p>A hole-in-anchor, a hole-in-plug, or a hole-in-bolt is used.</p> 	<p>Angle is used as it is, or a support angle is newly set.</p>  <p>Hanger bolt</p> <p>Hanging bolt</p> <p>Support angle</p>

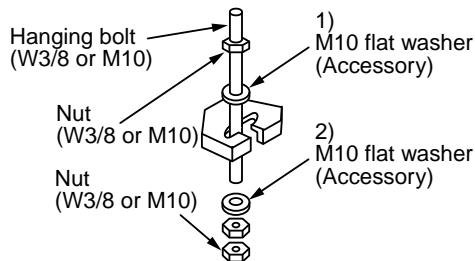
1. Hanging down of indoor unit

Refer to installation figures of hanging material and hanging bolt.

- Adjustment of hanging bolt length and nut position

Adjust hanging bolt length and nut position as shown in the figure before hanging down the indoor unit.

- Using the level vial, etc., set the horizontal level of the main unit within 5mm.



- 1) Required those other than M10 flat washer at site.
- 2) To prevent falling-off of bolt (safety), be sure to set it just under the hanging bracket as shown in the figure.

Considering pipe/wire connecting work inside the ceiling after the indoor unit has been hanged, select an installation place and determine piping direction.

- If the ceiling has been already set, prepare refrigerant pipe, drain pipe, connecting wire, switch panel cord, etc. at the place where pipe and wire are connected before hanging the main unit.

Installation of remote controller (Sold separately)

For installation of a remote controller, follow the Installation Manual attached to the remote controller.

- Do not install the remote controller at a place exposed to direct sunlight or near the stove.
- Install a remote controller after operating it and confirming that the indoor unit surely receives a signal. [Wireless type]
- Install a remote controller apart from the TV or stereo device, otherwise image disturbance or noise may generate. [Wireless type]

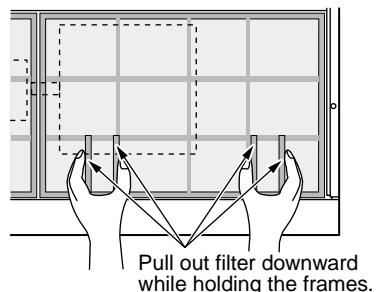
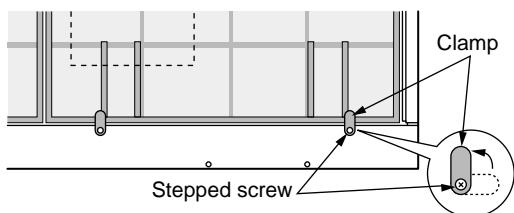
Mounting of clamp (Accessory)

In order to avoid falling of the air filter, be sure to mount the attached clamps with stepped screws.

(561BT : 2, 801BT to 1401BT : 4)

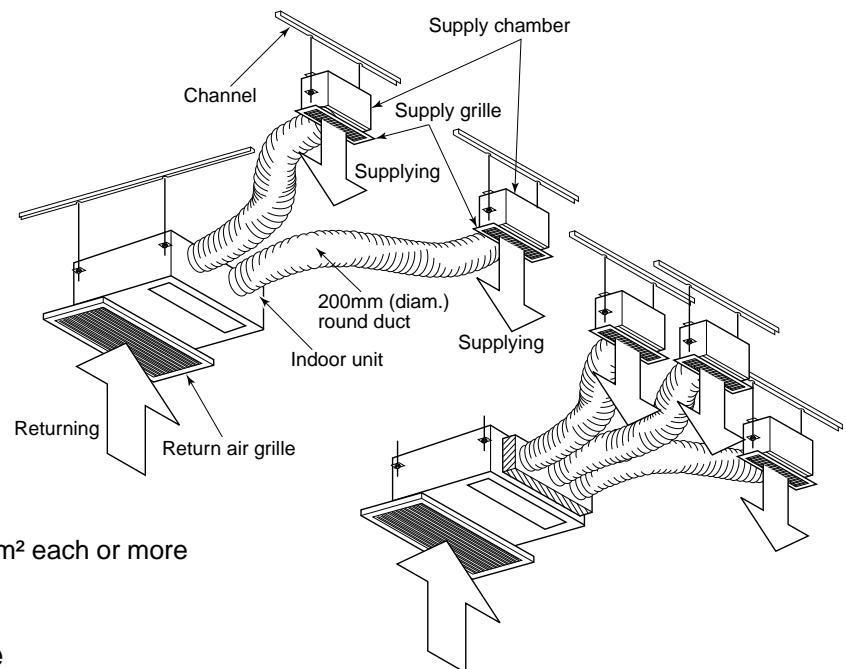
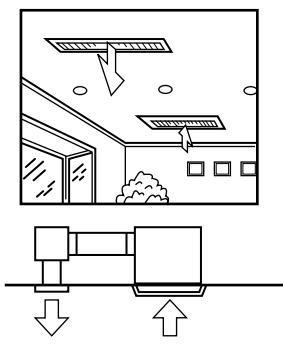
• Clamp mounting

• Removal of air filter



3 INSTALLATION OF INDOOR UNIT

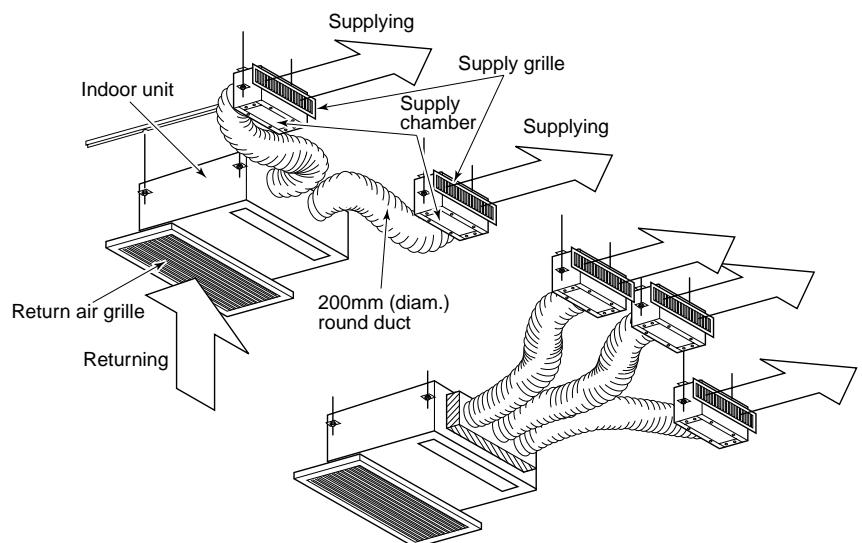
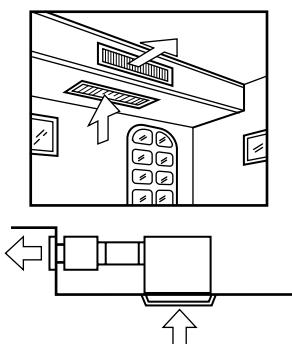
Concealed duct type



NOTE:

- Recommended supplying grille size 400 cm² each or more

Ledge ceiling concealed duct type



Quality of supplying grilles

SM561BT	2
SM801BT	3
SM1101BT	4
SM1401BT	4

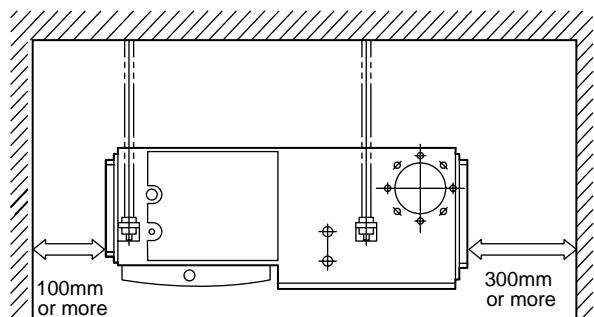
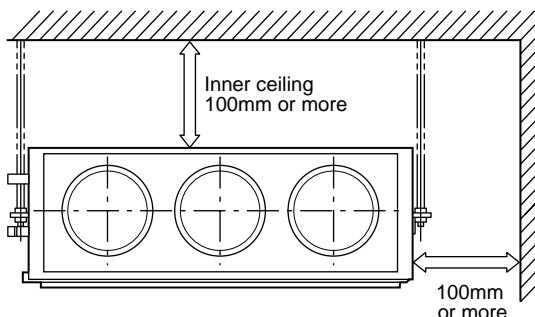
NOTE:

- Opening area of the return grille should be larger than the one for suction port (Air filter) of the indoor unit.

Restriction to installation

1. Installation clearance

- As shown in the figure, keep clearance around the indoor unit.



4 AIR DUCTING WORK

Static pressure characteristics of each model

Fig. 1 RAV-SM561BT (Round duct)

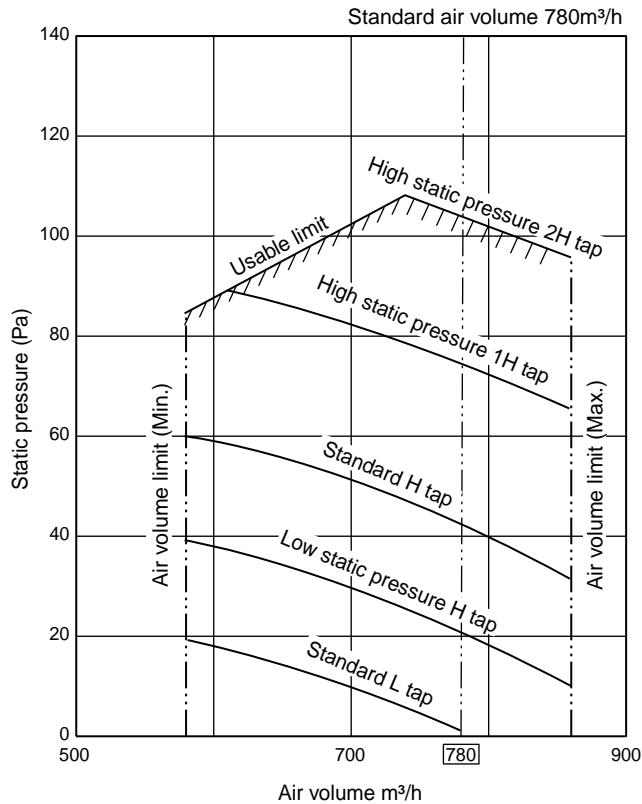


Fig. 3 RAV-SM801BT (Round duct)

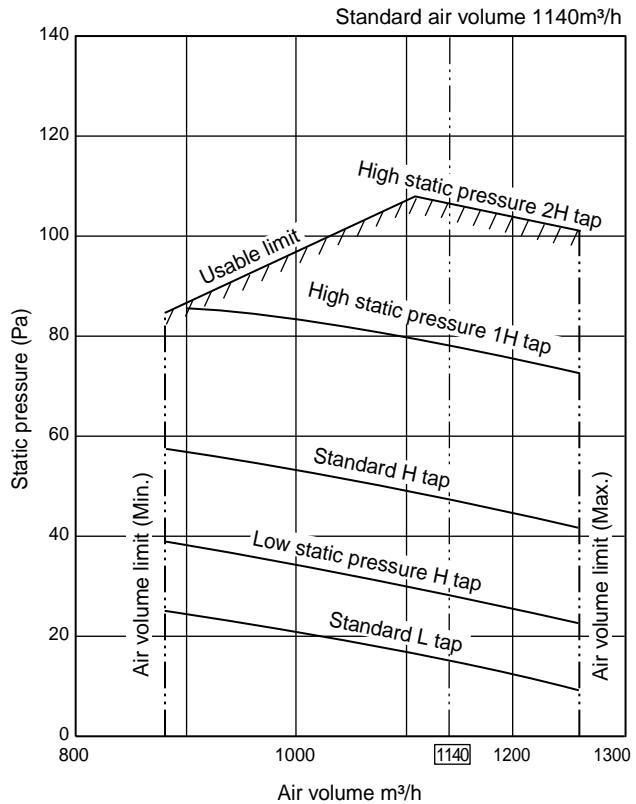


Fig. 2 RAV-SM561BT (Square duct)

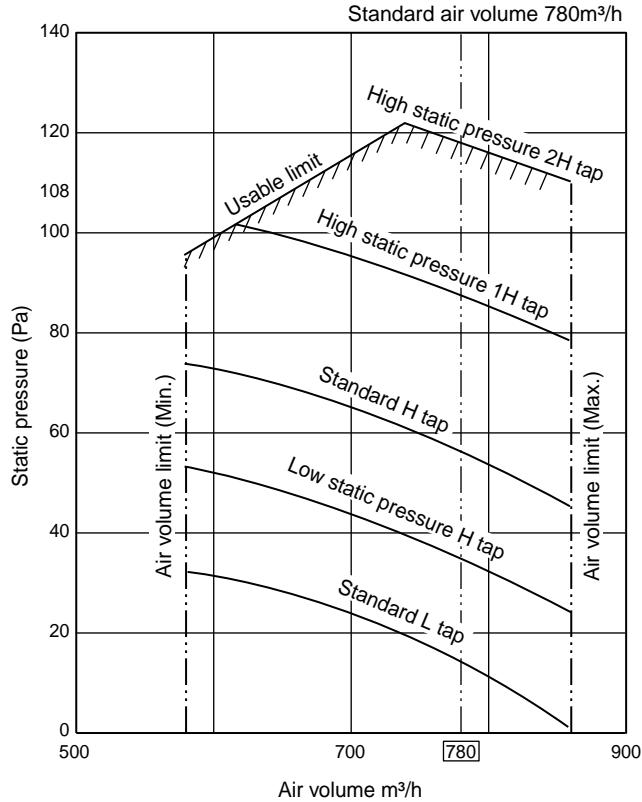
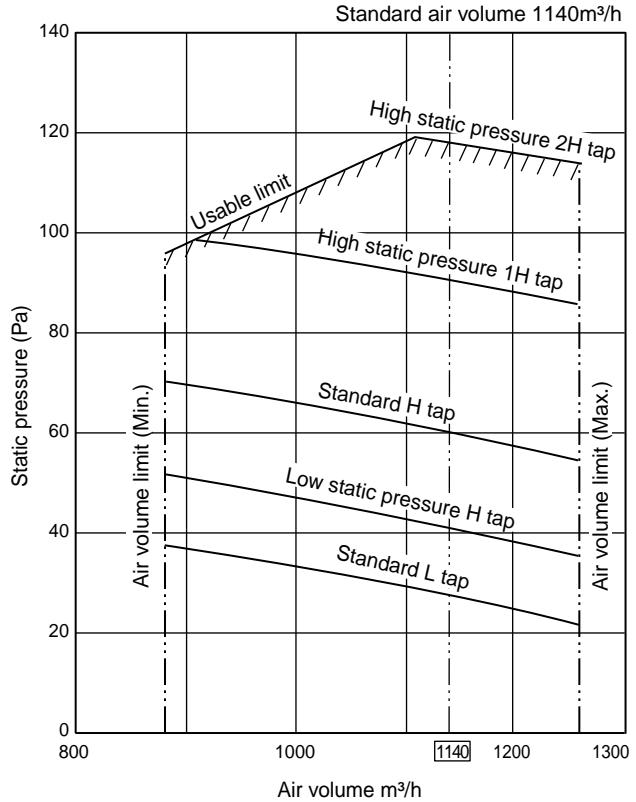


Fig. 4 RAV-SM801BT (Square duct)



4 AIR DUCTING WORK

Fig. 5 RAV-SM1101BT (Round duct)

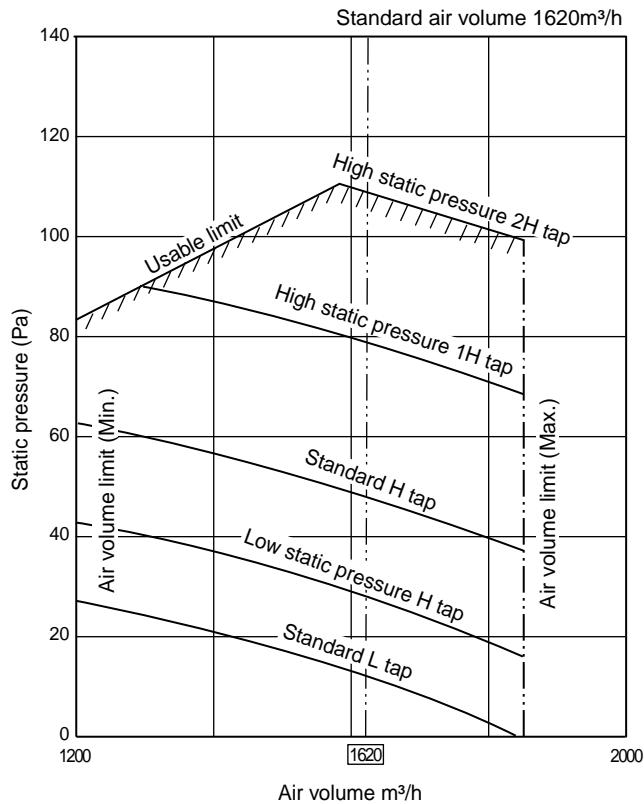


Fig. 7 RAV-SM1401BT (Round duct)

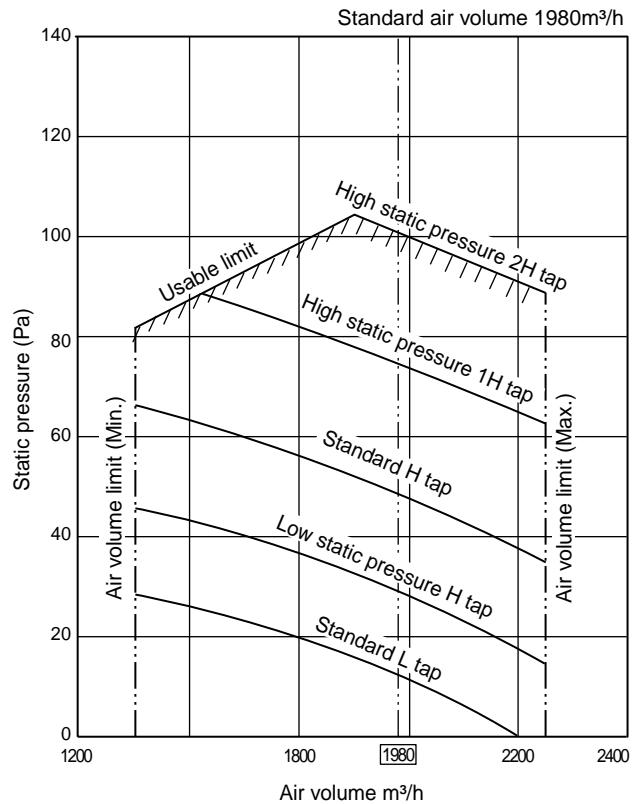


Fig. 6 RAV-SM1101BT (Square duct)

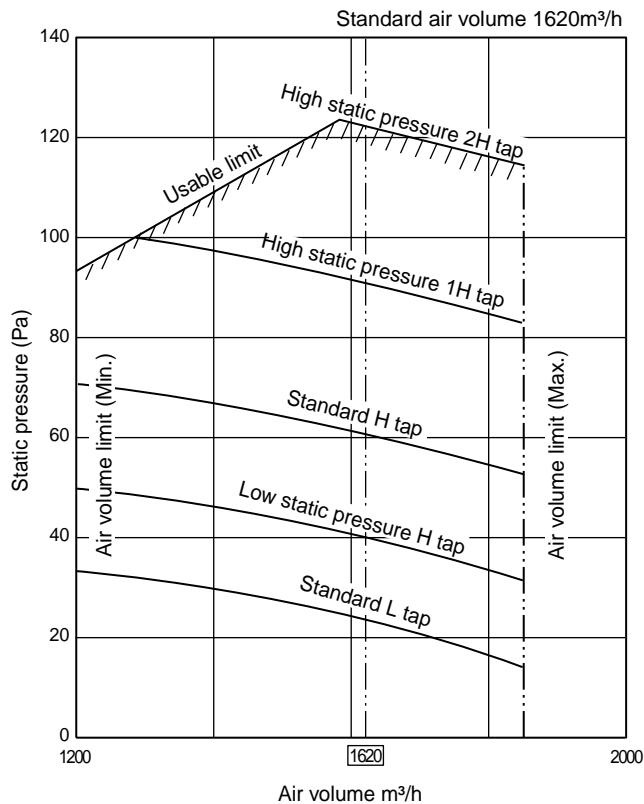
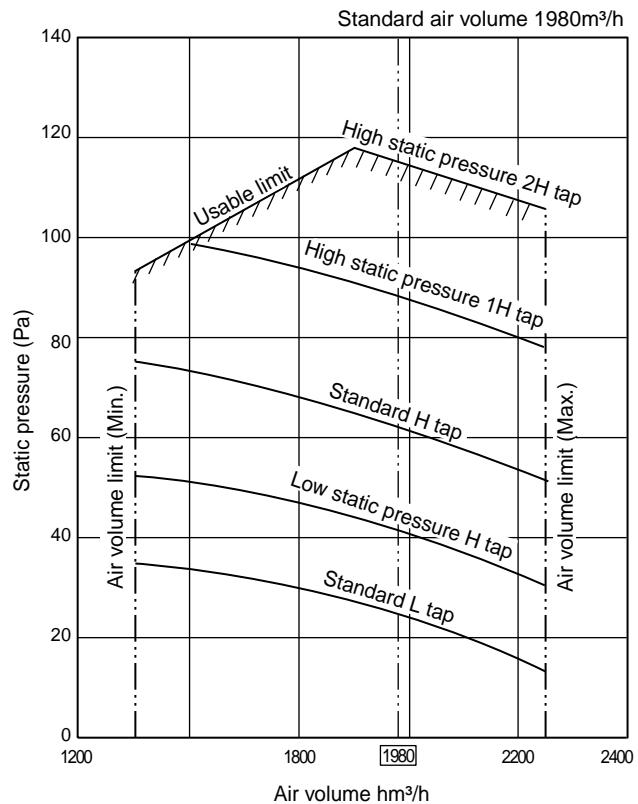


Fig. 8 RAV-SM1401BT (Square duct)

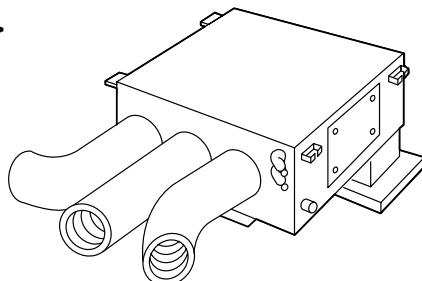


Installation reference

(Example for RAV-SM801BT model)

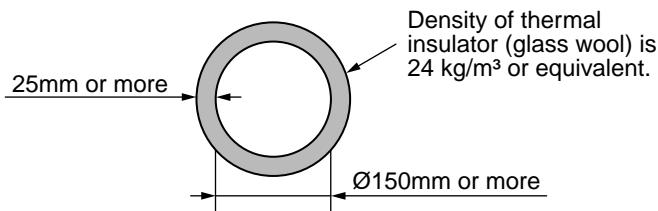
The air supply ducting work is classified in two ways, one is branched by the round ducts, and the other is branched by the square ducts. (Be sure to divide the air supply duct into three or more branches.)

<Round duct>



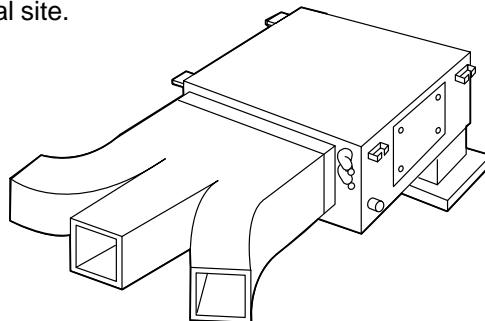
In case of the round duct, use the thermal insulator of thickness 25mm or more and inner diameter 150mm or more to the duct board.

(If the inner diameter is not enough, resistance increase, as the result, air does not flow smoothly and loss of the static pressure increases.) For the thermal insulator, use high-density glass wool of 24kg/m³ or equivalent.

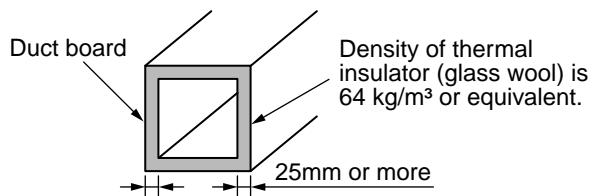


<Square duct> (Reference for square duct)

When using the square duct, change the type of the air supply flange from round type to square flange at the local site.



In case of the square duct, apply the thermal insulator of thickness 25mm or more to the duct board. For the thermal insulator, use high-density glass wool of weight 64kg/m³.



Connecting method of the duct

1. Supply air side

<Round duct>

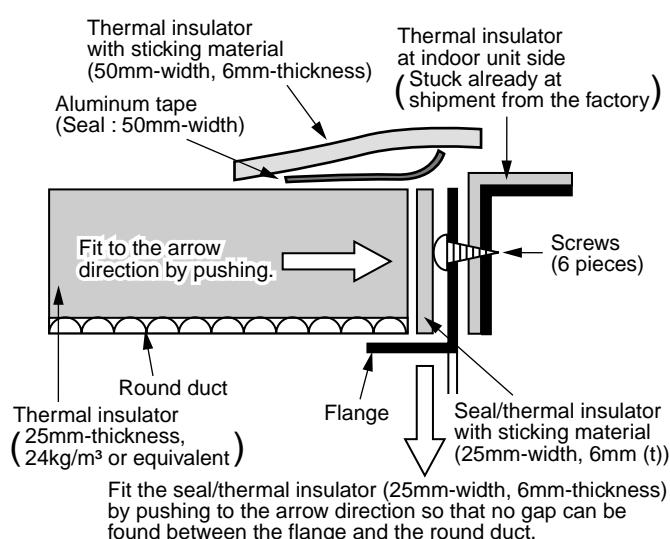


Fig. 2 (a)

<Square duct>

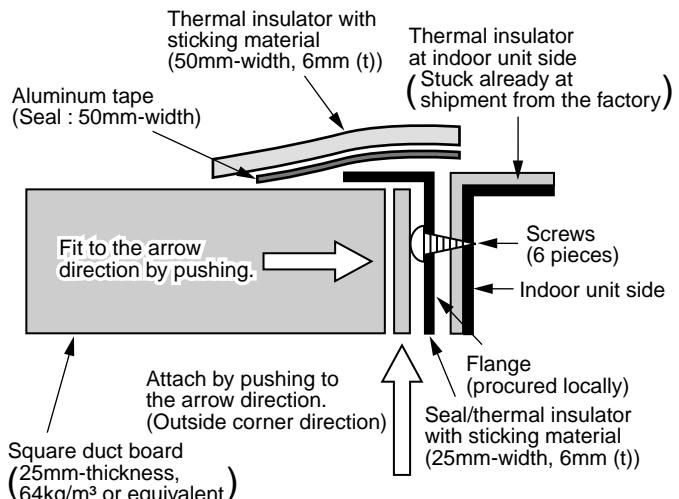


Fig. 2 (b)

CAUTION

Incomplete thermal insulation of the supply air flange and sealing may cause dew drops.

4 AIR DUCTING WORK

Connecting method of the duct

1. Supply air side

<Round duct>

1. Make the round duct according to inner dimension of the flange
Use a glass wool board with inside/outside finishing 25mm-thickness and 24kg/m³-density.
2. Connect the flange and each type of duct. (Fig. 1)

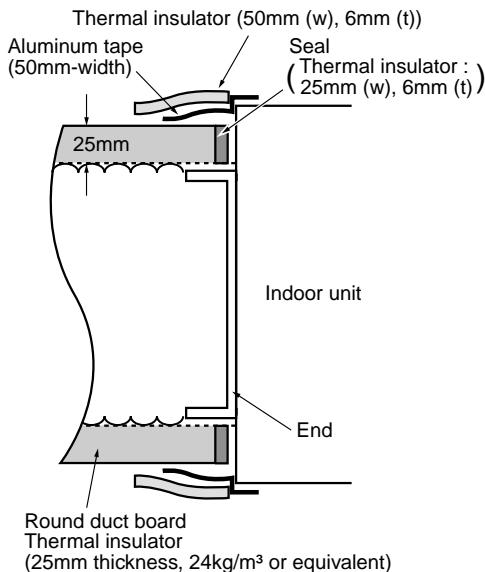


Fig. 1

<Square duct>

1. Using 6 screws, mount the flange to the supply air port of the indoor unit. (Fig. 2)
2. Make the square duct according to inner dimension of the flange **A** x **B**.
Use a glass wool board with inside/outside finishing 25mm-thickness and 24kg/m³-density.
3. Connect the flange and each type of duct. (Fig. 3)

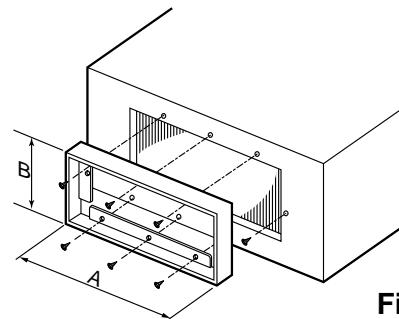


Fig. 2

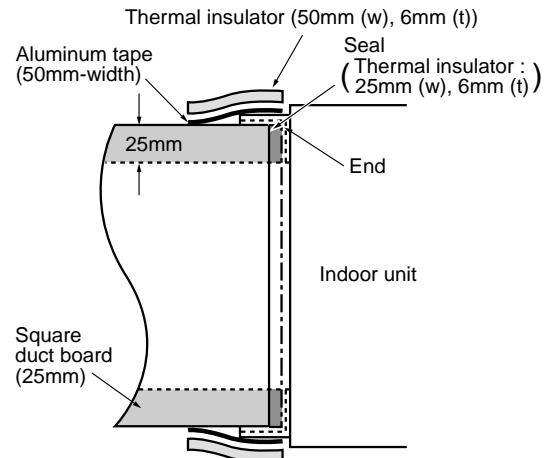


Fig. 3

Points at installation work

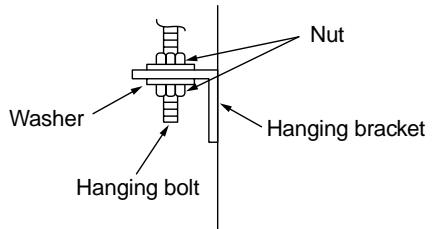
■ General cautions

1. Considering installation places of indoor unit supply chamber, structure of the building and determine the duct path.
2. In order to utilize the static pressure characteristics of the air supply in the indoor unit, design the duct branching having the large size of the air supply chamber or setting distance to the first branch as long as possible (Min. : 200mm or longer) so that an even air volume can be obtained.
Especially, when branching just after air supply of the indoor unit, air concentrates at the center part and is difficult to flow to the ducts at both sides.
3. Connect each connecting section surely, and apply sufficient thermal insulation.
In this model of which the duct is branched in the ceiling, compared with the model for ordinary houses, the high temperature generates on the periphery in the cooling time (Especially, at attic and etc.), temperature difference increases between the supply air and outside of the duct, and dewing may occur.
Dewing on the surface of the thermal insulator covering the metal connecting section or leaking portion of the cooled air may cause a trouble such as water drops.
4. Thermal insulation of screwing sections is necessary.
Prevent dewing by applying thermal insulation to 6 screws those fix the duct flange of the air supply chamber.
 - For duct parts, the flexible branch duct (thermal insulation, 25mm or more thickness) is recommended.
 - Adjust the duct length to 6m or less even for straight pipe, and avoid sharp bending (Air flow resistance is large.) if bending.

Hanging of indoor unit

Lift up the unit with a lifter, etc., and set the hanging metal in the hanging bolt.

- Hook nut of the hanging bolt to the groove of the hanging metal on the main unit.
- Using the level, etc., install the main unit horizontally.
Failure to do this will cause water leakage



Mounting of filter and canvas for suction port

1. Mount a long-life filter or a high-performance filter according to each Installation Manual.
2. Mount the canvases for suction port to the lower side of the above filter.

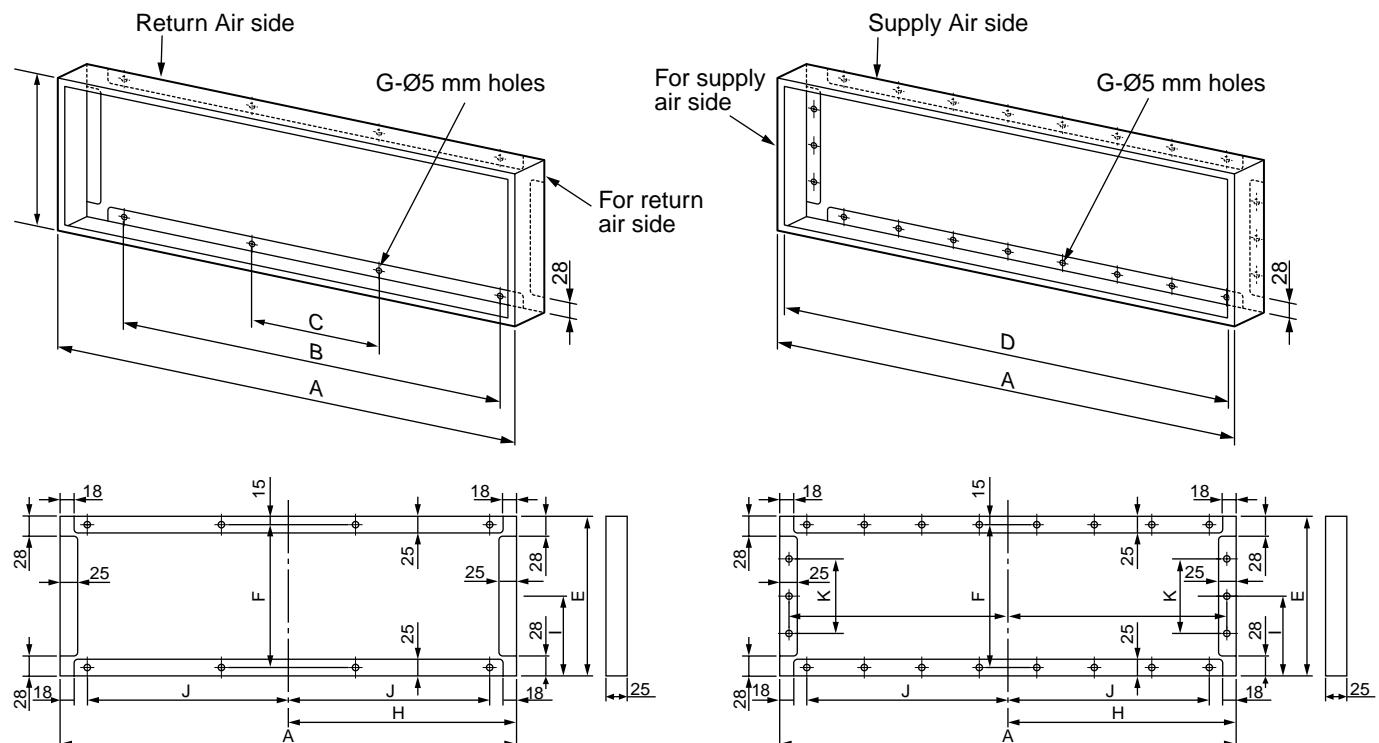
Mounting of remote controller

For the mounting of the wired remote controller, refer to the Installation Manual attached to the remote controller.

- Take out the remote controller cord together with the refrigerant pipe or drain pipe. Be sure to set the remote controller cord so that it passes through the upper side of the refrigerant pipe and drain pipe.

For reference

<Square duct> (Procured locally)

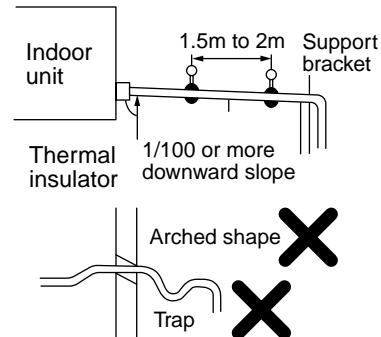


	Model	A	B	C	D	E	F	G	H	I	J	K
Return Air side (Return filter side)	SM561BT	700	—	400	—	420	390	4	350	195	—	—
	SM801BT	1000	700	430	—	420	390	8	500	195	350	—
	SM1101, 1401BT	1350	1050	580	—	420	390	8	675	195	525	—
Supply Air side	SM561BT	550	455 (65 x 7)	65	530	265	245	20	275	132.5	227.5	130
	SM801BT	850	715 (65 x 11)	65	830	265	245	28	425	132.5	307.5	130
	SM1101, 1401BT	1200	1105 (65 x 17)	65	1180	265	245	40	600	132.5	552.5	130

5 DRAIN PIPING WORK

Piping material

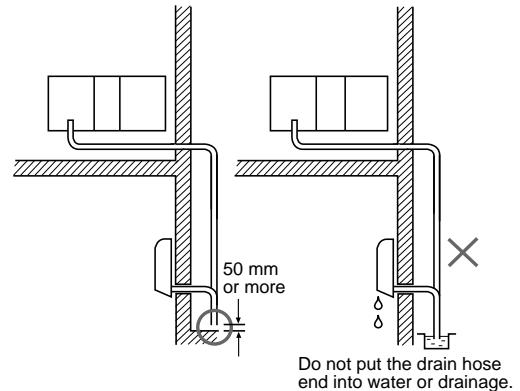
- For laying pipes underground, use hard vinyl chloride pipe. VP25 (Inner diameter Ø32mm)



Piping and cautions

- Set drain side of pipe at downward slope. (1/100 or more)
- Be sure to apply thermal insulation (foaming polyethylene, 10mm-thickness or more) for pipes passing through the room.
- Adhere the connecting sections with vinyl chloride agent surely so that no water leakage is caused.
 - Apply adhesive agent without unevenness around the portion approx. 40mm from the end of hard polyvinyl-chloride pipe.
 - Push the vinyl pipe in the drain socket completely up to the end of the socket.
 - Do not apply strength to the connecting part until the adhesive agent has dried and hardened.
- Support the piping with hanging bracket so that the force is not applied to connection sections of pipe and pipe is not waved.

- As shown in the figure, set the collective piping such as the ceiling duct so that waste water does not back up from the main pipe.

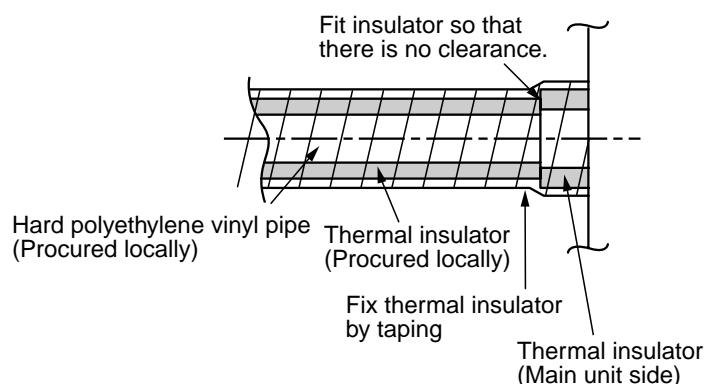


NOTES :

- Do not make slack or trap at halfway across piping.
- Set pipes so that the end of drain pipe is not dipped in water, and also keep space 50mm or more to the ground.
- After piping work, check if water drains smoothly.
- Hole should be made at a slight downward slant to the outdoor side.
- When connecting extension drain hose, insulate the connecting part of extension drain hose with shield pipe.

Thermal-insulating process

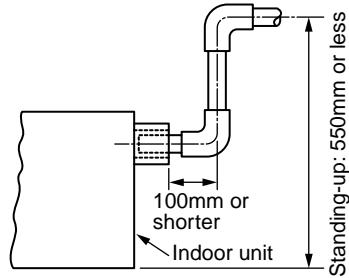
- After checking water drain, be sure to apply the thermal-insulating for connecting portion of the pipes.
- Apply taping so that there is no clearance on the fitting part of thermal-insulator of the main unit with the insulator procured locally.



Drain-up

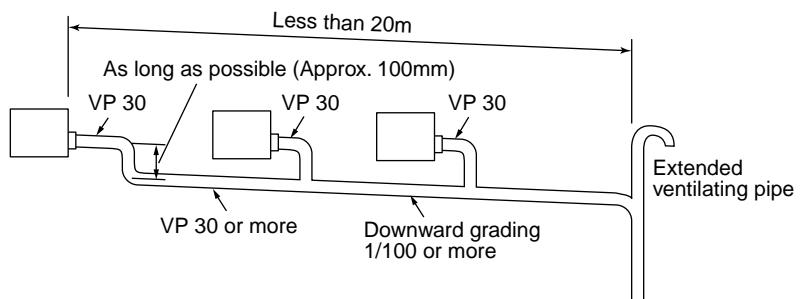
If down-slope cannot be set on a drain pipe, drain-up is possible.

- Set the height of drain pipe 550mm or less from the bottom face of the indoor unit.
- Pull out the drain pipe from connecting port of the drain pipe of the indoor unit by 100mm or shorter, and stand up it vertically.
- After standing up it vertically, arrange immediately so that it is set with down-slope.



Connection of the drain hose

- Insert the drain hose completely into the connecting port of the drain pan.
- Apply thermal insulation surely to the drain hose with socket thermal insulation seal.



Check of water drain

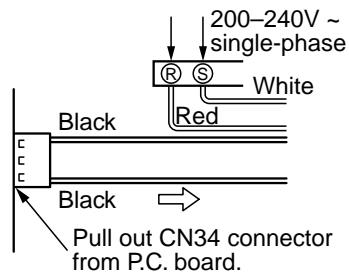
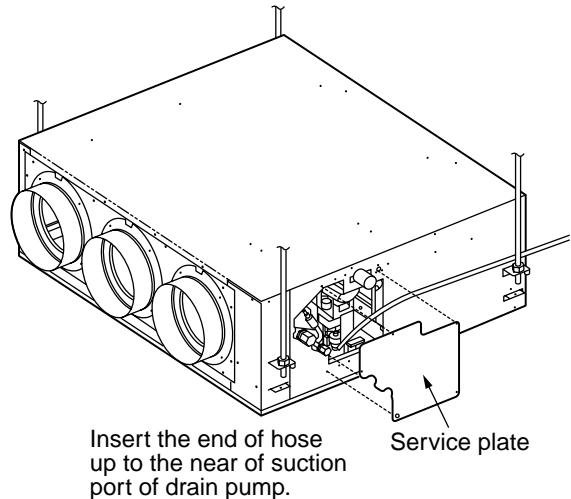
After drain pipe work, check that water is drained and there is no water leak from pipe connection portion. In this time, also check there is no trouble of motor sound of the drain pump. Be sure also to perform this check when installing the unit in heating time.

After electric piping work

- Before installing a panel, infuse water as shown in the following figure. By operating the unit in COOL mode, check that water is drained from the drain pipe and then check there is no water leak from the drain pipe.

Before electric piping work

- Pull out the float switch connector (3P: Red) from connector (CN34: Red) on P.C. board of the electric parts box. (In this time, be sure to check the power has been turned off.)
- Connect 200V single-phase to (R) and (S) of the power supply terminal block. (Never apply 200V to (A), (B), (U₁), and (U₂) of the terminal block, otherwise it causes a trouble of P.C. board.)
- Infuse water followed to the figure below. (Water amount: 1500cc to 2000cc)



- The drain pump automatically operates by power-on. Check that water is drained from the drain pipe and then check there is no water leak from the drain pipe.
- After checking water drain and water leak, turn off the power, connect the float switch connector to the original position (CN34) of P.C. board, and then return the electric parts box to the original position.

6 REFRIGERANT PIPING

Refrigerant piping

- If the outdoor units are to be mounted on a wall, make sure that the supporting platform is sufficiently strong. The platform should be designed and manufactured to maintain its strength over a long period of time, and sufficient consideration should be given to ensuring that the outdoor unit will not fall.
- Use copper pipe with 0.8 mm or more thickness.**
- Flare nut and flare works are also different from those of the conventional refrigerant. Take out the flare nut attached to the main unit of the air conditioner, and use it.

CAUTION

IMPORTANT 4 POINTS FOR PIPING WORK

- Remove dust and moisture from the inside of the connecting pipes.
- Tight connection (between pipes and unit)
- Evacuate the air in the connecting pipes using VACUUM PUMP.
- Check the gas leakage. (connected points)

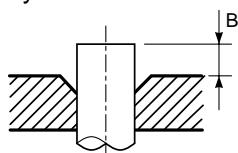
Permissible piping length and heat

The maximum piping length from the outdoor to indoor unit	
30 m (Chargeless 20 m) (RAV-SM561/801AT)	15 m (Chargeless 15 m) (RAV-SM1101/1401AT)
The maximum height difference outdoor/indoor unit	
Outdoor unit is above	Outdoor unit is below
30 m	30 m

Flaring

Insert a flare nut into the pipe, and flare the pipe. As the flaring sizes of R410A differ from those of refrigerant R22, the flare tools newly manufactured for R410A are recommended.

However, the conventional tools can be used by adjusting projection margin of the copper pipe.



Projection margin in flaring : B (Unit : mm)

Rigid (Clutch type)

Outer diam. of copper pipe	R410A tool used		Conventional tool used	
	R410A	R22	R410A	R22
6.4 to 15.9	0 to 0.5	(Same as left)	1.0 to 1.5	0.5 to 1.0

Imperial (Wing nut type)

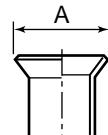
Outer diam. of copper pipe	R410A	R22
6.4 or 9.5	1.5 to 2.0	1.0 to 1.5
12.7 or 15.9	2.0 to 2.5	1.5 to 2.0

• Flaring dia meter size : A (Unit : mm)

Outer diam. of copper pipe	A ^{+0.4} _{-0.4}	
	R410A	R22
6.4	9.1	9.0
9.5	13.2	13.0
12.7	16.6	16.2
15.9	19.7	19.4

* In the case of flaring for R410A with the conventional flare tool, pull out it approx. 0.5 mm more than that for R22 to adjust to the specified flare size.

The copper pipe gauge is useful for adjusting projection margin size.



Tightening connection

CAUTION

- Do not apply excessive torque. Otherwise, the nut may crack depending on the conditions.

(Unit : N·m)

Outer diam. of copper pipe	Tightening torque
6.4 mm (diam.)	14 to 18 (1.4 to 1.8 kgf·m)
9.5 mm (diam.)	33 to 42 (3.3 to 4.2 kgf·m)
12.7 mm (diam.)	50 to 62 (5.0 to 6.2 kgf·m)
15.9 mm (diam.)	63 to 77 (6.3 to 7.7 kgf·m)

• Tightening torque of flare pipe connections

Pressure of R410A becomes higher than that of R22.

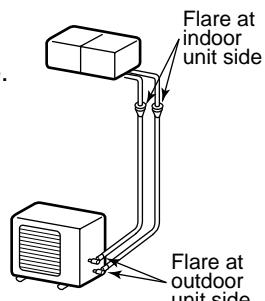
(Approx. 1.6 times) Therefore, using a torque wrench, tighten firmly the flare pipe connecting

sections which connect the indoor and outdoor units up to the specified tightening torque.

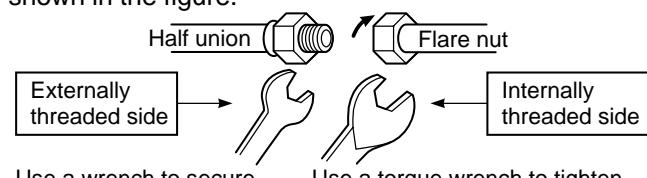
Incorrect connections may cause not only a gas leakage,

but also a trouble of the refrigeration cycle or

compressor damage.



Align the centers of the connecting pipes and tighten the flare nut as far as possible with your fingers. Then tighten the nut with a spanner and torque wrench as shown in the figure.



Use a wrench to secure.

Use a torque wrench to tighten.

7 EVACUATING

AIR PURGE

Evacuate the air in the connecting pipes and in the indoor unit using vacuum pump.
Do not use the refrigerant in the outdoor unit.
For details, see the manual of vacuum pump.

Use a vacuum pump

Be sure to use a vacuum pump with counter-flow prevention function so that inside oil of the pump does not flow backward into pipes of the air conditioner when the pump stops.

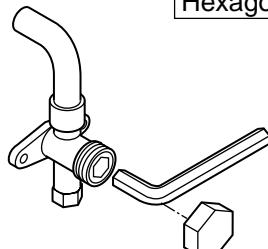
1. Connect the charge hose from the manifold valve to the service port of the gas side packed valve.
2. Connect the charge hose to the port of vacuum pump.
3. Open fully the low pressure side handle of the gauge manifold valve.
4. Operate the vacuum pump to start evacuating.
Perform evacuating for about 35 minutes if the piping length is 30 meters total for model SM560 and 50 meters for model SM800, SM1100, SM1400 (assuming a pump capacity of 27 liters per minute.)
Then confirm that the compound pressure gauge reading is -101 kPa (-76 cmHg).
5. Close the low pressure side valve handle of gauge manifold.
6. Open fully the valve stem of the packed valves (both sides of Gas and Liquid).
7. Remove the charging hose from the service port.
8. Securely tighten the caps on the packed valves.

Packed valve handling precautions

- Open the valve stem all the way out ; do not try to open it beyond the stopper.
- Securely tighten the valve stem cap at the torque as follows:

15.9 mm (diam.)	68 to 82 N•m (6.8 to 8.2 kgf•m)
12.7 mm (diam.)	50 to 62 N•m (5.0 to 6.2 kgf•m)
9.5 mm (diam.)	33 to 42 N•m (3.3 to 4.2 kgf•m)
6.4 mm (diam.)	14 to 18 N•m (1.4 to 1.8 kgf•m)

Hexagonal wrench is required.



Open valve fully

Open valves of the corresponding outdoor units fully.

Gas leak check

Using a lead detector or soap water, check there is no gas leak from pipe connecting portion or caps of the valves.

REQUIREMENT

For a leak detector, use one manufactured exclusively for HFC refrigerant (R410A, R134a, etc.)

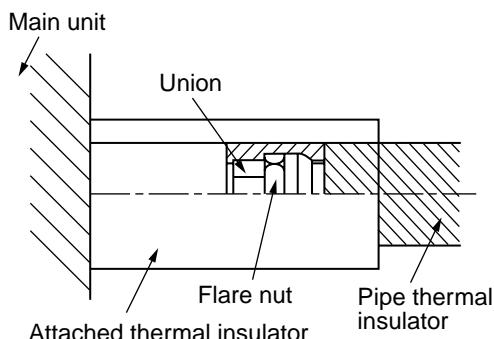
Thermal-insulating process

Perform pipe thermal-insulating process for liquid and gas sides separately.

- For thermal insulator to pipes at gas side, use one with heat resisting temperature 120°C or higher.
- Using the attached thermal insulator, perform surely thermal insulation without gap for pipe connecting portion of the indoor unit.

REQUIREMENT

Perform surely thermal insulation process so that the naked end of pipe connecting portion of the indoor unit does not appear.
(Exposure of the pipe may cause water leak.)

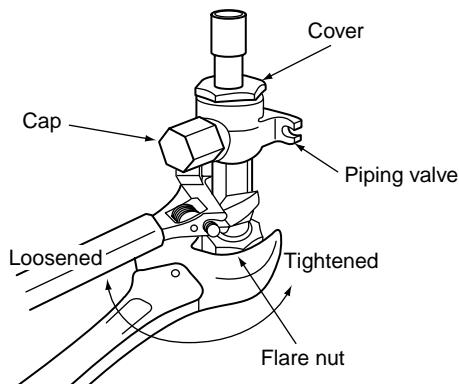


7 EVACUATING

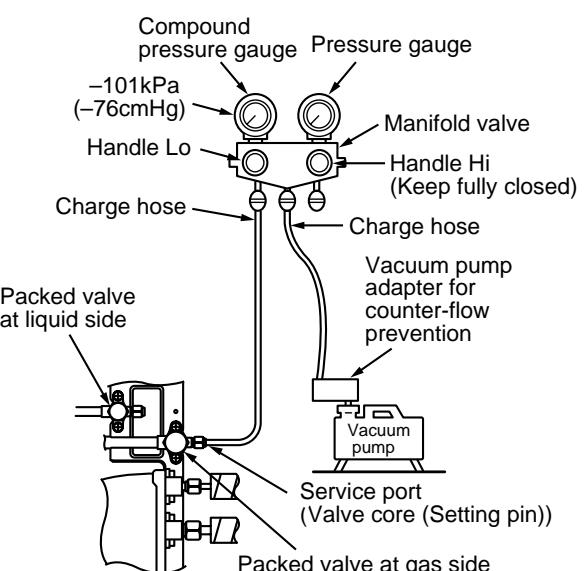
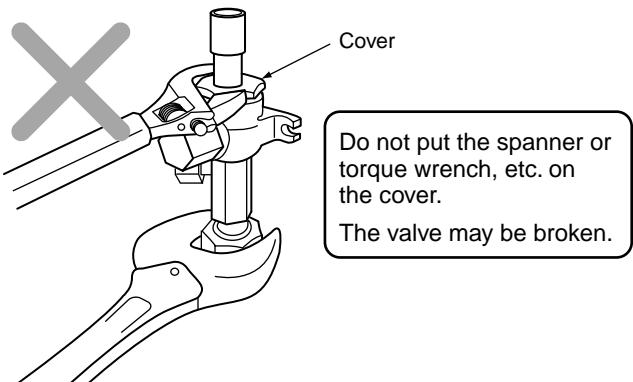
<For 801, 1101, 1401AT model>

- As shown in the figure, be sure to use a double spanner to loosen or tighten the flare nut of the valve at gas side. If using a single spanner, the nut cannot be tightened with necessary tightening torque.

On the contrary, use a single spanner to loosen or tighten the flare nut of the valve at liquid side.



801, 1101, 1401 type valve at gas side



8 ELECTRICAL WORK

NOTE:

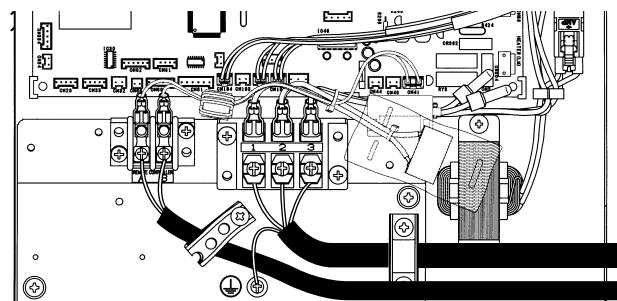
For selection and connection method of the power supply cords, refer to the details in the Installation Manual of the outdoor unit.

CAUTIONS

- Be sure connect earth wire.
Do not connect the earth wire to gas pipe, pipe of water supply, lightning conductor, and earth wire of telephone.
An incomplete grounding causes an electric shock.
- If incorrect/incomplete wiring is carried out, it may cause an electrical fire or smoke.
- Prepare the power supply for exclusive use with the air conditioner.
- Be sure to use the cord clamps with attached to the product.
- Using the specified cables, connect the cables surely so that the external force of cable is not transmitted to the terminal connecting portion.
- Do not damage or scratch the conductive core and inner insulator of power and inter-connecting cables when peeling them.
- Be sure to comply with local regulations on running the wire from outdoor unit to indoor unit (wire size of wire and wiring method etc.)
- Use the power cord and Inter-connecting cable of specified thickness, specified type, and protective devices required.
- Never connect 220-240V power to the terminal blocks for communication ((A), (B))
(It causes a trouble.)

How to wire

1. Connect the connecting cable to the terminal as identified with their respective numbers on the terminal block of indoor and outdoor unit. H07 RN-F or 245 IEC 66 (1.5 mm² or more)
2. Mount a leakage breaker.
3. Insulate the unsheathed redundant cords (conductors) with tape.
4. For inter-unit wiring, do not use a wire jointed to another on the way.
5. Fix the cable with cord clamp.

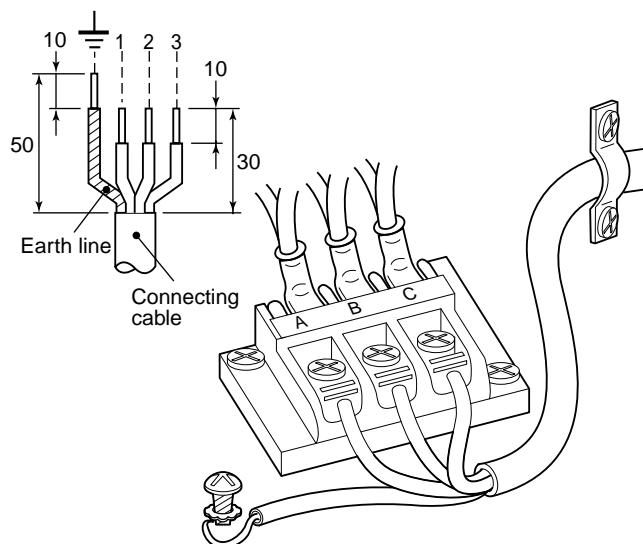
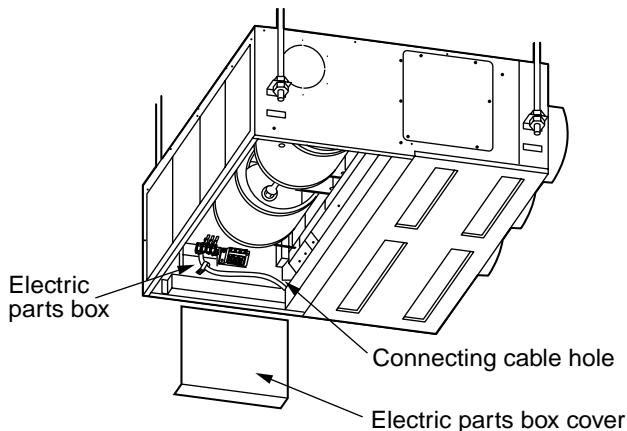


8 ELECTRICAL WORK

Cabling

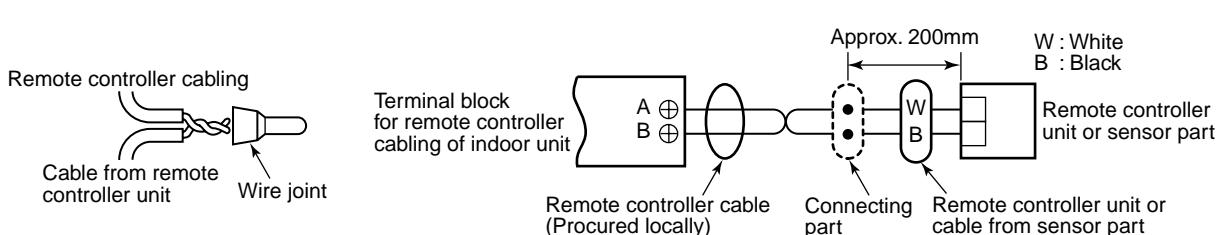
1. As shown in the figure, remove a screw ① and then remove cover of the electric part.
2. Strip wire ends (10 mm).
3. Match wire colors with terminal numbers on indoor and outdoor units' terminal blocks and firmly screw wires to the corresponding terminals.
4. Connect the ground wires to the corresponding terminals.
5. Fix the cable with cord clamp.
6. Fix cover of the parts box and the terminal block surely with the fixing screws.

Make a loop for the margin of the cable length so that the electric parts box can be taken out during servicing.



Remote controller cabling

- Strip approx. 14mm the cable to be connected.
- Non polarity, 2 core cable is used for cabling of the remote controller.
- Twist cable of the remote controller to be connected with cable of the remote controller unit (or sensor), and press-fit them with a wire joint. (Wire joints (White: 2 pieces) are included in the attachments to the remote controller (sold separately) or the wireless remote controller kit (sold separately).



Cabling diagram

- For details of cabling/installation of the remote controller, refer to the Installation Manual attached to the remote controller.
- When the remote controller is used for the first time, it accepts an operation approx. 5 minutes after the power supply has been turned on. It is not a trouble, but is because the setup of the remote controller is being checked. For the second power-ON time and after, approx. 1 minute is required to start the operation by the remote controller.

9 TEST RUN

Before test run

- Before turning on the power supply, carry out the following procedure.
 - 1) Using 500V-megger, check $1M\Omega$ or more exists between the terminal block 1 to 3 and the earth.
If $1M\Omega$ or less is detected, do not run the unit. Do not apply to the remote controller circuit.
 - 2) Check the valve of the outdoor unit being opened fully.
- To protect the compressor at activation time, leave power-ON for 12 hours or more be for operating.

How to execute a test run

Using the remote controller, operate the unit as usual.

For the procedure of the operation, refer to the attached Owner's Manual.

A forced test run can be executed in the following procedure if the operation stops by thermo.-OFF.

In order to prevent a serial operation, the forced test run is released after 60 minutes have passed and returns to the usual operation.

CAUTION

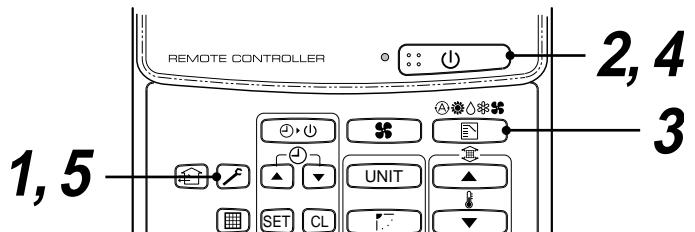
When the remote controller is used for the first time, it accepts an operation approx. 5 minutes after the power supply has been turned on.

It is not a trouble, but is because the setup of the remote controller is being checked.

For the second power-ON time and after, approx. 1 minute is required to start the operation by the remote controller.

NOTE

Do not use the forced test run for cases other than the test run because it applies an excessive load to the devices.



In case of wired remote controller

Procedure	Description
1	Keep button pushed for 4 seconds or more. [TEST] is displayed on the display part and the selection of mode in the test mode is permitted.
2	Push button.
3	Using , select the operation mode, [COOL] or [HEAT]. <ul style="list-style-type: none">• Do not run the air conditioner in a mode other than [COOL] or [HEAT].• The temperature controlling function does not work during test run.• The detection of error is performed as usual.
4	After the test run, push button to stop a test run. (Display part is same as procedure 1.)
5	Push check button to cancel (release from) the test run mode. ([TEST] disappears on the display and the status returns to a normal.)

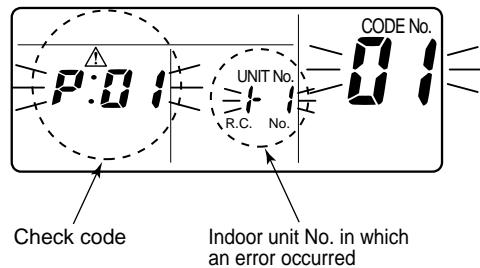
10 TROUBLESHOOTING

Confirmation and check

When a trouble occurred in the air conditioner, the check code and the indoor unit No. appear on the display part of the remote controller.

The check code is only displayed during the operation.

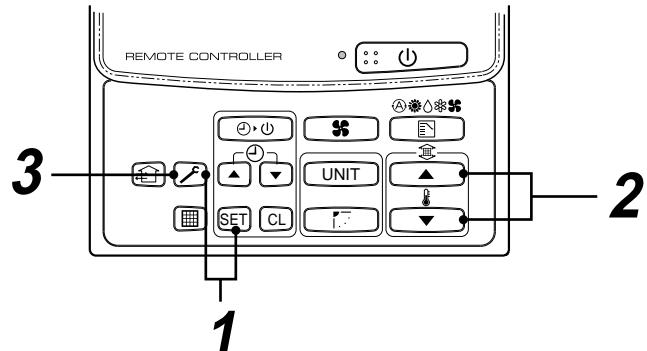
If the display disappears, operate the air conditioner according to the following "Confirmation of error history" for confirmation.



Confirmation of error history

When a trouble occurred on the air conditioner, the trouble history can be confirmed with the following procedure. (The trouble history is stored in memory up to 4 troubles.)

The history can be confirmed from both operating status and stop status.



Procedure	Description
1	<p>When pushing [SET] and buttons at the same time for 4 seconds or more, the following display appears.</p> <p>If [Service check] is displayed, the mode enters in the trouble history mode.</p> <ul style="list-style-type: none">• [01 : Order of trouble history] is displayed in CODE No. window.• [Check code] is displayed in CHECK window.• [Indoor unit address in which an error occurred] is displayed in UNIT No.
2	<p>Every pushing of , button used to set temperature, the trouble history stored in memory is displayed in order.</p> <p>The numbers in CODE No. indicate CODE No. [01] (latest) → [04] (oldest).</p> <p>REQUIREMENT</p> <p>Do not push button because all the trouble history of the indoor unit will be deleted.</p>
3	After confirmation, push button to return to the usual display.

1. Check the troubles according to the above procedure.
2. Ask an authorized dealer or qualified service (maintenance) professional to repair or maintain the air conditioner.
3. More details of the service code are explained in Service Manual.

11 APPLICABLE CONTROLS

NOTIFICATION

When using the equipment at the first time, it will take a lot of time that the remote controller accepts an operation after power was on. However, it is not a trouble.

• Automatic address

- While automatic addressing, the operation cannot be performed on the remote controller.
- For automatic addressing, Max. 10 minutes (generally, approx. 5 minutes) are required.

• When power will be turned on after finish of automatic addressing;

- It will require Max. 10 minutes (generally, approx. 3 minutes) that outdoor unit starts operation after power was on.

As all the buttons have been set to [Standard] at the shipment, change the setup of the indoor unit if necessary.

To change the setup, use the main remote controller (wired remote controller).

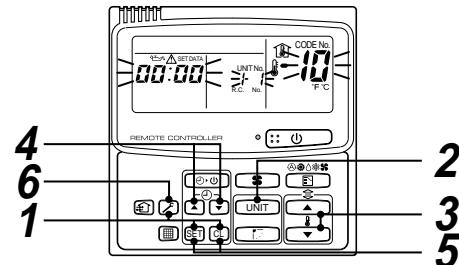
* The setup change for wireless remote controller, sub remote controller, or remote controller-less system (Central control remote controller only is provided.) is impossible. In these cases, prepare and mount a separate main remote controller.

Exchange of applicable control setup

Basic operation procedure for setup exchange

Change the setup while operation of the equipment stops.

(Be sure to stop the operation of a set.)



Procedure	Description
1	<p>When pushing SET, CL, and ⌫ buttons simultaneously for 4 seconds or more, after a while, the display part flashes as shown in the figure. Check that the displayed item code is [10].</p> <ul style="list-style-type: none">• If the item code indicates other than [10], push ⌫ button to erase the display, and then retry the operation from the first step. (For some time after ⌫ button has been pushed, the operation of the remote controller cannot be accepted.) <p>(In a group control, the firstly displayed indoor unit No. becomes the master unit.)</p> <p>(* The display changes according to the indoor unit model.)</p>
2	<p>Every pushing UNIT button, the indoor unit No. in the group control is displayed successively. Select an indoor unit of which setup to be changed.</p> <p>In this time, the position of the indoor unit of which setup to be changed can be confirmed because the fan and the flap of the selected indoor unit work.</p>
3	<p>Using ▲, ▼ buttons of set temperature, specify the item code [**].</p>
4	<p>Using ▲, ▼ buttons of set timer, select set data [****].</p>
5	<p>Push SET button. In this time, if the display changes from flashing to lighting, the setup completes.</p> <ul style="list-style-type: none">• To change the setup of an indoor unit other than the selected one, start operation from Procedure 2.• To change the setup of another setup in the selected indoor unit, start operation from Procedure 3. <p>Pushing CL button clears the set up contents which have been already set. In this case, retry from Procedure 2.</p>
6	<p>When the setup finished, push ⌫ button. (The setup is determined.)</p> <p>Pushing ⌫ button deletes the display and returns the status to normal stop status.</p> <p>(For some time after ⌫ button has been pushed, the operation of the remote controller cannot be accepted.)</p>

11 APPLICABLE CONTROLS

Setup of external static pressure

Matching with the resistance (External static pressure) of the duct to be connected, be sure to set up the tap exchange according to the basic operation procedure (1 → 2 → 3 → 4 → 5 → 6).

- For the item code in Procedure 3, specify [5d].
- For the set data in Procedure 4, select the setup data of static pressure outside of the machine to be set up from the table below.

(Exchange by wired remote controller)

Set data	External static pressure	
0000	40Pa	Standard (At shipment)
0001	70Pa *1	High static pressure 1
0003	100Pa *2	High static pressure 2
0006	20Pa	Low static pressure

*1: For SM1401BT, set 65Pa.
*2: For SM1401BT, set 90Pa.

To incorporate a filter sold separately

When mounting a filter sold separately, be sure to set up the tap exchange according to the type of filter.

In this case, also follow to the basic operation procedure (1 → 2 → 3 → 4 → 5 → 6).

- For the item code in Procedure 3, specify [5d].
- For the set data in Procedure 4, select the setup data of filter to be incorporated from the table below.

Set data	Filter sold separately	
0000	Standard filter (At shipment)	Optical regeneration deodorizing filter
	Optical regeneration deodorizing filter	
0001	High-performance filter 65, 90	Deodorant filter Ammonia deodorizing filter
	Deodorant filter Ammonia deodorizing filter	

When using wireless remote controller

To exchange the static pressure, there is a method other than the abovementioned method by wired remote controller, which is to shift the short plug on the indoor microcomputer P.C. board as shown in the following table. Adopt this method in case of using a wireless remote controller, etc.

- * However, after exchanging once, be careful to shift the short plug to the standard position (At shipment) in order to return to the standard setup (follow to E2PROM setup) though the setup for high static-pressure 1, high static-pressure 2, or low static-pressure can be arbitrarily performed.

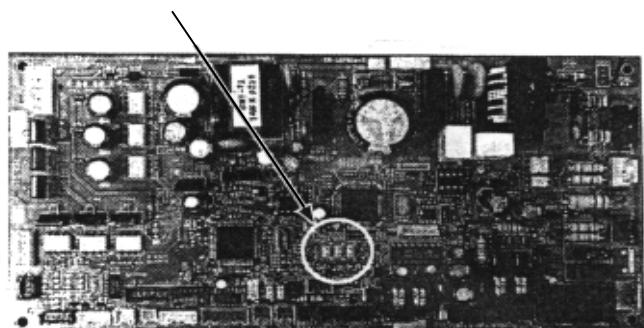
It is necessary to rewrite data from the wired remote controller sold separately in the set data "0000".

- Select with shifting of the short plug on the indoor unit microcomputer P.C. board.

Short plug position	External static pressure	Filter sold separately
Short Open	40Pa	Standard filter (At shipment) Optical regeneration deodorizing filter
CN112 CN111 CN110 H H H	70Pa	*1 High-performance filter 65 High-performance filter 90 Deodorant filter Ammonia deodorizing filter
CN112 CN111 CN110 H H H	100Pa	—
CN112 CN111 CN110 H H H	20Pa	—

*1 Resistance of high-performance filter 65 and 90, deodorant filter, or ammonia deodorizing filter is equivalent to 30Pa. Therefore, set the resistance (external static pressure) of a duct to be connected to 40Pa.

- Short plug position (CN112, CN111, CN110 from the left)



Change of lighting time of filter sign

According to the installation condition, the lighting time of the filter sign (Notification of filter cleaning) can be changed.

Follow to the basic operation procedure

(**1** → **2** → **3** → **4** → **5** → **6**).

- For the item code in Procedure **3**, specify [01].
- For the set data in Procedure **4**, select the setup data of lighting time of filter sign to be changed from the table below.

Set data	Filter sign lighting time
0000	None
0001	150H
0002	2500H (At shipment)
0003	5000H
0004	10000H

Check and test operation

Be sure to test the pipe connections for gas leak.

- Check the flare nut connections, valve stem cap connections and service port cap connections for gas leak with a leak detector or some soap water.

To secure better effect of heating

When it is difficult to obtain satisfactory heating due to installation place of the indoor unit or structure of the room, the detection temperature of heating can be raised. Also use a circulator, etc. to circulate heat air near the ceiling.

Follow to the basic operation procedure

(**1** → **2** → **3** → **4** → **5** → **6**).

- For the item code in Procedure **3**, specify [06].
- For the set data in Procedure **4**, select the setup data of shift value of detection temperature to be set up from the table below.

Set data	Shift value of detection temp.
0000	No shift
0001	+1°C
0002	+2°C (At shipment)
0003	+3°C
0004	+4°C
0005	+5°C
0006	+6°C

12 INSTALLATION/SERVICING TOOLS

Tools

Tools	Applicable to R22 model	
Gauge manifold	<input type="checkbox"/>	
Charge hose	<input type="checkbox"/>	
Electronic balance for refrigerant charging	<input checked="" type="checkbox"/>	
Torque wrench (nominal diam. 1/4, 3/8, 1/2, 5/8)	<input type="checkbox"/>	

Tools	Applicable to R22 model	
Flare tool (clutch type)	<input checked="" type="checkbox"/>	
Gauge for projection adjustment	—	—
Vacuum pump adapter	<input checked="" type="checkbox"/>	
Gas leak detector	<input type="checkbox"/>	

: Newly prepared (They are special requirements for R407C, separate from those for R22.)

: Existing tools are available.

For the details of the tools, refer to the Installation manual of the outdoor unit.

13 MAINTENANCE

Cleaning of Return grille

Preparation :

1. Turn off the main power supply switch (or breaker) before the unit maintenance.
2. Dismount the Return grille.

Clean the Return grilles with water:

- Wipe down the Return grille with a sponge or towel moistened with a kitchen detergent.
(Do not use any metallic brush for cleaning.)
- Carefully rinse the Return grille to wash out the detergent.
- After rinsing the Return grille with water, dry it in the shade.

CAUTION

- Do not start the air conditioner while leaving the return grille removed.

Cleaning of Air Filters

- If the air filters are not cleared, it not only impairs the cooling performance of air conditioner but causes a failure in the air conditioner such as water drops.

Preparation :

1. Turn off the main power supply switch (or breaker) before the unit maintenance.
2. Dismount the Return grille.

Use a vacuum cleaner to remove dust from the filters or wash them with water.

- After rinsing the air filters with water, dry them in the shade.
- Set the air filter into the air conditioner.

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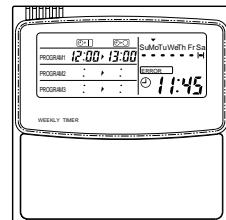
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OWNER'S MANUAL

WEEKLY TIMER FOR AIR CONDITIONER (SPLIT TYPE)

<Program Weekly Timer Type>

RBC-EXW21E



Thank you very much for purchasing TOSHIBA Weekly Timer for Air Conditioner.

Please read this owner's manual carefully before using your Weekly Timer for Air Conditioner.

- Be sure to obtain the "Owner's manual" and "Installation manual" from constructor (or dealer).

Request to constructor or dealer

Please clearly explain the contents of the Owner's manual and hand over it.

FEATURES

1. Using the dialogue system, Start/Stop operations three times per one day can easily set with unit of 1 minute. The program for a week is also set up.
2. To set the holidays (public holidays, consecutive holidays, etc.), the operation reserve can temporarily cancelled.
3. The present time, the day of the week and the operation contents under execution of the program are displayed with 24-hours notation.
4. The output can be forcibly turned on without changing the program.
5. As the backup function is incorporated in this model, the reserve contents of the program are stored in memory during a power failure.

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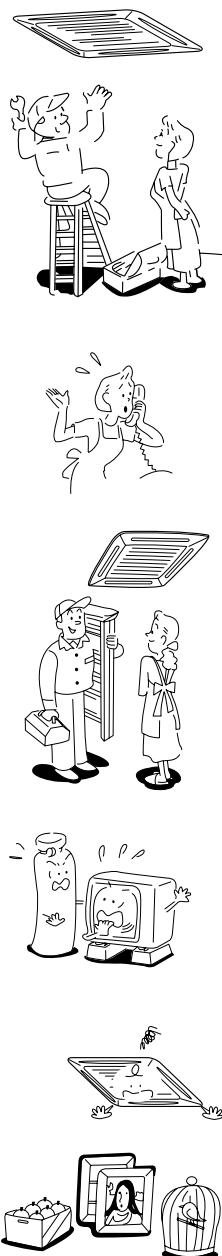
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PRECAUTIONS FOR SAFETY

WARNING

WARNINGS ABOUT INSTALLATION

- Make sure to ask the qualified installation professional in electric work to install the weekly timer for air conditioner. If the weekly timer for air conditioner is inappropriate installed by yourself, it may cause water leak, electric shock, fire, and so on.



WARNINGS ABOUT OPERATION

- When you notice something abnormal with the air conditioner (smells like something scorching, poor cooling, etc.), immediately turn off the main switch, the circuit breaker, from the mains to stop the air conditioner, and contact the dealer. If the air conditioner is continuously operated with something abnormal, it may cause machine failure, electric shock, fire, and so on.

WARNINGS ABOUT MOVEMENT AND REPAIR

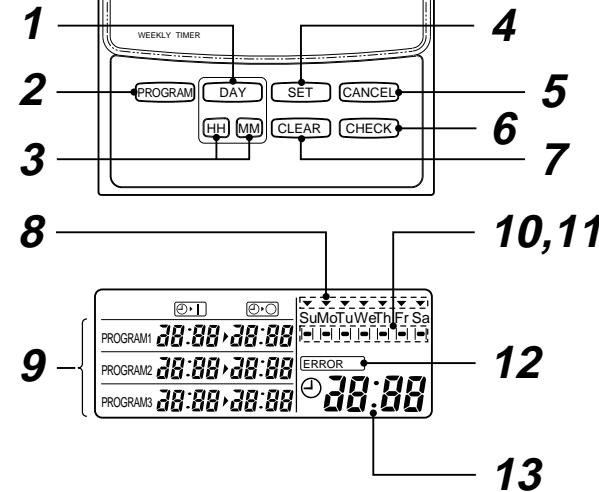
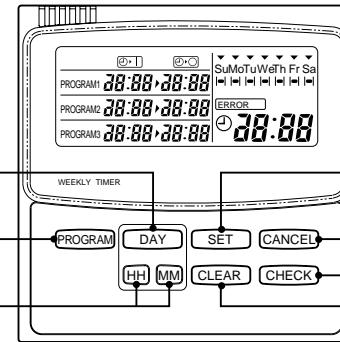
- Do not move or repair any unit by yourself. Since there is high voltage inside the unit, you may get electric shock when removing the cover and main unit.
- Whenever the air conditioner needs repair, make sure to ask the dealer to do it. If it is repaired imperfectly, it may cause electric shock or fire.
- When moving the air conditioner for re-installing at another place, ask the dealer to do it. If it is imperfectly installed, it may cause electric shock or fire.

CAUTION

CAUTIONS ABOUT OPERATION

- Carefully read this manual before starting the weekly timer for air conditioner. There are many important things to keep in mind for daily operation.
- Do not use this weekly timer for air conditioner for special purpose such as preserving food, precision instruments, art objects, breeding animals, growing potted plants, etc.
- Do not touch any switches with wet finger, otherwise you may get an electric shock.
- If the air conditioner was not be used for a considerably long time, turn off the main switch or the circuit breaker, for safety. Disconnect from the power supply prevents the unit from lightning and power supply surge.
- Prevent any liquid from falling into the weekly timer. Do not spill juice, water or any kind of liquid.

NAME AND OPERATION OF EACH PART



1 Day select button

The day of the week is selected. Each pushing,  mark moves in order of Sunday → Monday → Tuesday → Wednesday → Thursday → Friday → Saturday.

2 Program button

This button is used to set up the contents of the program operation.

3 Hour/Minute button

This button is used to set the present time and ON/OFF time.

4 Timer set button

This button is used to set the day of the week, hour, minute, holiday, and ON/OFF time.

5 Cancel button

This button is used to cancel as the holiday.

6 Check button

This button is used to confirm the contents of the setting items.

7 Cancel button

This button is used to cancel the setting items.

8 Display of the present day of the week (mark)

ON/OFF time of the timer operation is displayed.

10 Operation reserve indication (mark)

The day of the week when the program operation has been set is displayed.

11 Holiday setting indication (mark)

The holiday is displayed (Cancel as holiday)

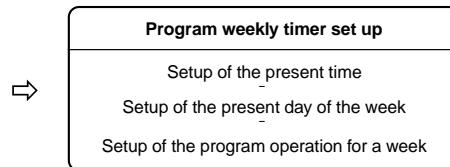
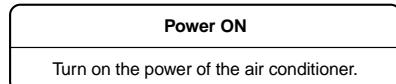
12 Setting error display

13 Present time display

Displays the present time displayed with 24-hours notation.

HOW TO USE THE TIMER CORRECTLY

1. Operation procedure



2. Turn on the power supply of the air conditioner

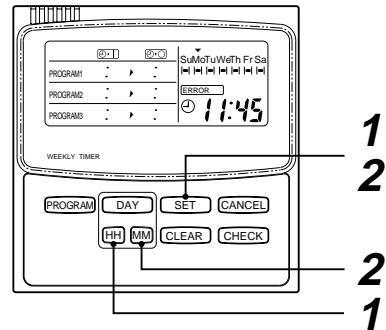
- Turn on the power supply of the air conditioner connected with a program weekly timer. (For cooling and heating, do not turn off the power supply for compressor heating.)

3. Setup of the present time

- Set the present time
(Example: Case that the present time is 11:45.)

1 While push **SET** button push **HH** button to select "hour" of the present time.

- While push **SET** button each pushing **HH** button, change sequentially.
 $0 \rightarrow 1 \rightarrow \dots \rightarrow 10 \rightarrow \dots \rightarrow 23 \rightarrow 0$
- While keep **SET** button pushed, continuous pushing **HH** button makes fast forward. (Example: Leave the finger at display of 11, you can set 11 o'clock.)
- When release **SET** button, the hour is set, and **④** mark changes flashing to light.



2 While push **SET** button push **MM** button to select "minutes" of the present time.

- While push **SET** button, each pushing **MM** button change sequentially.
 $00 \rightarrow 01 \rightarrow \dots \rightarrow 58 \rightarrow 59 \rightarrow 00$
- While keep **SET** button pushed continuous, pushing **MM** button makes fast forward. (Example: Leave the finger at display of 45 you can set 45 minutes.)
- When release **SET** button, the minutes are set, and **④** mark make changes flashing to light.

CAUTION

- The time cannot be changed only when **HH** button or **MM** button pushed.
- If 30 seconds have passed while the button is flashing without pushing **DAY** or **HH** / **MM** buttons, the display returns automatically to the original display (Normal display). In this case, repeat the procedure from the 1st step.

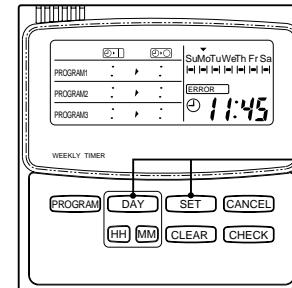
4. Setup of the day of the week

- Set the today of the week.
(Example: Case of Wednesday)

1 While push **SET** button push **DAY** button to select "today" of the week.

- While pushing **SET** button, each push **DAY** button, the display of the present day of the week **▼** flashes, and the display moves in order.

$\downarrow \downarrow \downarrow \downarrow \downarrow \downarrow$
SuMoTuWeTh Fr Sa



CAUTION

- The day of the week cannot be changed only when **DAY** button is pushed.
- If 30 seconds have passed while the button is flashing without pushing **DAY** or **HH** / **MM** buttons, the display returns automatically to the original display (Normal display). In this case, repeat the procedure from the 1st step.

5. How to set program timer operation

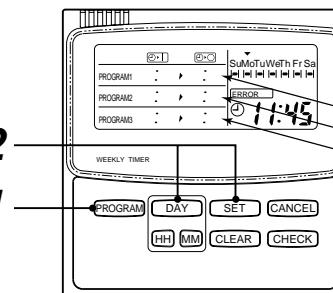
Set the present time and the present day of the week surely, otherwise the program operation is not correctly performed.

This timer can control up to 3 cycle program per day.
(1 cycle or 2 cycles can be also set up.)

The following items can be set to the program operation.

- Setup of [ON] ® [OFF] time ([ON] or [OFF] only cannot be set up singly.

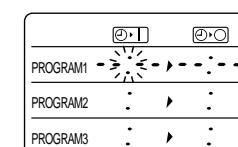
<Name and functions>



- Operation time of program 1
- Operation time of program 2
- Operation time of program 3

Example:
To set the operation time of Monday as follows:
From 8:00 to 12:00 } Operates
From 12:40 to 16:50 }
From 17:00 to 19:00 }

SuMoTuWeTh Fr Sa



1 First push **PROGRAM** button.

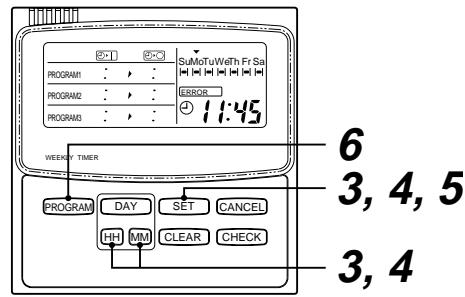
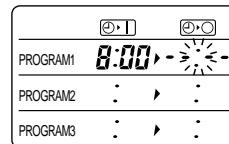
- When pushing **PROGRAM** button, the reserve mark **■** flashes.

2 Push **DAY** button, select the day for operation and then push **SET** button.

- When pushing **SET** button, the flashed reserve mark **■** changes, and ON time of the program 1 flashes at the same time.

3 Set ON time by **HH, **MM** buttons, and then push **SET** button.**

When push **SET** button, the flashed ON time (8:00 in example) change, and OFF time of the program 1 flashes at the same time.



6
3, 4, 5
3, 4

4 Set OFF time by **HH / **MM** buttons, and then push **SET** button.**

When pushing **SET** button, the flashed ON time (12:00 in example) changes, and ON time of the program 2 flashes.

5 Next set up the operation time to the program 2 and 3.

When pushing **SET** button after OFF time of the program 3 has been set, the flashed OFF time (19:00 in example) changes and ON time of the program 1 flashes.

6 Finally, push **PROGRAM button.**

Push **PROGRAM** button within 30 seconds after No. 5 step.

Then, one day timer (Monday in example) is set completely. **ON/OFF is displayed when the present time is included in the range of the set time.**

(In the above status, the contents of the program 1 are displayed as the present time is included in the range from ON time to OFF time of the program 1.)

7 Setting to other day, repeat above procedure from 1 to 6.

If you need to set the same time as previous setting. Refer to "7. How to copy the program operation time".

CAUTION

- Setup of the program time : **0:00** is treated as **24:00**.

(Example) In the following cases, setup are available.

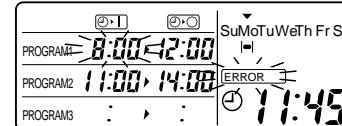
ON time	OFF time
0:00	2:00
22:00	0:00

- If 30 seconds have passed while the button is flashing without pushing **DAY** or **HH** / **MM** buttons, the display returns automatically to the original display (Normal display). In this case, repeat the procedure from the 1st step.

6. Set error

If flashing **ERROR** is displayed when the program operation has been set up, correct the time following the procedure below.

- When flashing **ERROR** is displayed, ON time of the failed program flashes.



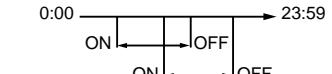
- Push **SET** button to flash the time to be corrected.
- Using **HH** / **MM** buttons, correct ON/OFF time.
- Push **SET** button. When the setup is correctly performed, **ERROR** display disappears.
- The correction has completed by pushing **PROGRAM** button.

CAUTION

- When ON/OFF time is set as follows, **ERROR** is displayed.

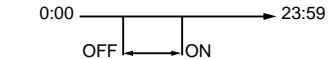
- When a part of the operation time makes inroads into a part of another operation time

Example:	ON time	OFF time
	8:00	12:00
	11:00	14:00



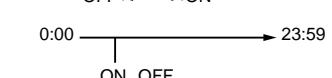
- When OFF time is ahead of ON time

Example:	ON time	OFF time
	12:00	8:00



- When ON time is same as OFF time

Example:	ON time	OFF time
	8:00	8:00



- ON time or OFF time is singly set up

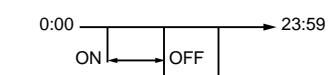
Example:	ON time	OFF time
	8:00	[Is not set]



- The following cases are not set error.

- OFF time of the previous cycle is same as ON time of the next cycle.

Example:	ON time	OFF time
	8:00	12:00
	12:00	19:00



- When the next cycle is set to the time before the set time of the previous cycle

Example:	ON time	OFF time	⇒	ON time	OFF time
	12:40	12:50		12:40	16:50
	8:00	12:00		12:40	16:50



Pushing the **PROGRAM** button changes the order in order of time.

- When both ON and OFF times are same 0:00

Example:	ON time	OFF time
	0:00	0:00

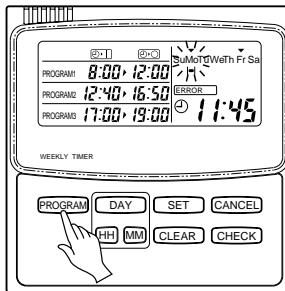
Continuous operation for 24 hours

7. How to copy the program operation time

When setting the program operation, already set program can be copied and set to the other day of the week.

<Example: To copy the operation contents of Monday to Tuesday>

- Push **CHECK** button in normal display.
- Push **DAY** button and put the operation reserve indication **■** on the day of the week of which the program operation is already set. (Monday in the example)
- Push **PROGRAM** button. Present day of the week indication **▼** and Operation reserve indication **■** flash.
- Push **DAY** button and put the present day of the week indication **▼** on the day of the week to be copied. (Tuesday in the example) (For continuous copying, push **SET** button, and then push **DAY** button.)
- Push **PROGRAM** button. The operation reserve indication **■** goes on under the copied day of the week.

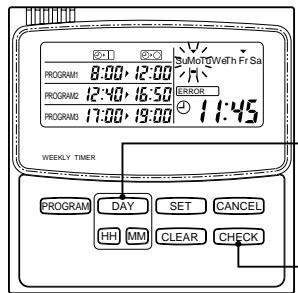


8. How to check the program operation time

- Push **CHECK** button.

<Example: Case to check the program operation time of Wednesday in Monday>

- The operation reserve indication **■** flashes in the normal display status.

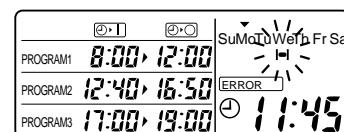


2

1,
3

- Push **DAY** button and put the operation reserve indication **■** on the day of the week to be checked.

- Every pushing **DAY** button, the operation reserve indication **■** flashes and the contents of program operation time of the day of the week on which the operation reserve indication **■** has been put on is displayed.



- Push **CHECK** button.

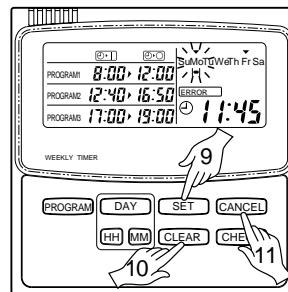
- It turns to be normal indication.

CAUTION

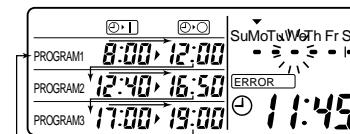
- While reserve indication **■** is flashing, the display does not change even if other buttons are pushed than **DAY**, **CHECK**, and **PROGRAM** button.
- If 30 seconds have passed while the reserve indication **■** is flashing without pushing **DAY**, **CHECK** or **PROGRAM** button, the display returns automatically to the original display. (Normal display)

9. How to change the program operation time

- Push **PROGRAM** button in the normal display status.
- Select the required day reserve mark **■** by pushing **DAY** button.
- Push **SET** button.



- Each push **SET** button, the flashing part changes in the following figure. Put the indication on the time to be changed.
- Using **HH** / **MM** buttons, change the time.
- Push **SET** button.
- Push **PROGRAM** button. Then the change operation has completed.



10. How to clear the program operation

• Clear of the day of the week

- Push **PROGRAM** button.
- Push **DAY** button and select the reserve mark **■** to be cancelled.
- Push **CLEAR** button. The program time disappears.
- Push **PROGRAM** button. The operation reserve indication **■** disappears.

• Clear of a part of the program

- Push **PROGRAM** button.
- Push **DAY** button and select the reserve mark **■** on a to be cancelled.
- Push **SET** button.
- Push **SET** button again to flash ON or OFF time of the program to be cancelled.
- Push **CLEAR** button.

Then, a part of the program has been cancelled. At the same time, the remained programs are automatically arranged.

- Push **PROGRAM** button.

11. How to set up the holiday

• The operation reserve day can be cancelled by setting up the holiday.

- Push **CANCEL** button. The holiday setup mark **■** flashes.
- Push **DAY** button and select the holiday setup mark **■** on the day which the holiday is set.
- Push **SET** button. The flashing holiday setup indication **■** changes on. (**■**)

• Clearance of [HOLIDAY] setup

- Push **CANCEL** button.
- Push **DAY** button and select the holiday setup mark **■** on the day to which the holiday is cancelled.
- Push **SET** button. The holiday setup mark **■** disappears and the operation reserve mark **■** appears.

• Explanation of operation

The cancel setting day is temporarily canceled, and from the next day, the cancel setup mark **■** disappears and the operation reserve mark **■** appears.

CAUTION

- For the day which does not set timer, the cancellation cannot be set.

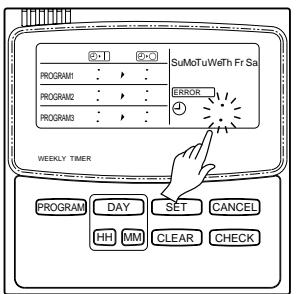
12. Matters to be memorized

1. Power failure

When a power failure occurred and the power supply has been reset, the display of the right figure appears. (A colon ":" flashes.)

• Resuming of operation

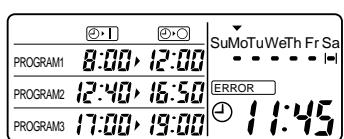
- 1) Turn on the power (breaker) of the air conditioner.
- 2) Start operation by the remote controller.
- 3) Push **PROGRAM** button of the program weekly timer. The flashing colon ":" changes to the clock display in the normal status. In this case, the program is memorized by the backup function. Therefore, it is unnecessary to set the program again.



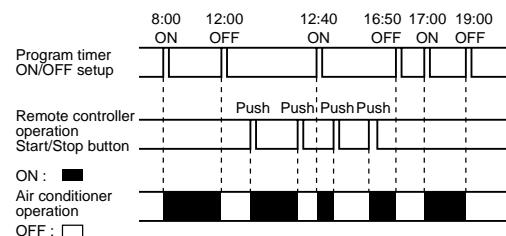
2. Operation of program weekly timer and air conditioner

An air conditioner mounted with a program weekly timer is operated on a remote controller and on the program weekly timer.

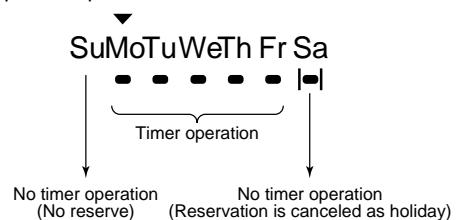
(Example)



1) Operation pattern in a day



2) Operation pattern in a week

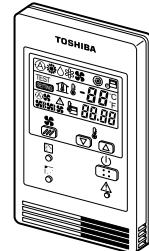


OWNER'S MANUAL

REMOTE CONTROLLER FOR AIR CONDITIONER

<Simple Operation Type>

RBC-AS21E



Thank you very much for purchasing TOSHIBA Remote Controller for Air Conditioner.

Please read this owner's manual carefully before using your Remote Controller for Air Conditioner.

- Be sure to obtain the "Owner's manual" and "Installation manual" from constructor (or dealer).

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PRECAUTIONS FOR SAFETY

WARNING

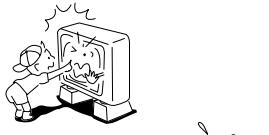
WARNINGS ABOUT INSTALLATION

- Make sure to ask the qualified installation professional in electric work to install the remote controller. If the remote controller is inappropriate installed by yourself, it may cause, electric shock, fire, and so on.



WARNINGS ABOUT OPERATION

- When you are aware of something abnormal with the air conditioner (smells like something etc.), immediately turn off the main power supply switch or circuit breaker, from the mains to stop the air conditioner, and make contact with the dealer. If the air conditioner is continuously operated with something abnormal, it may cause machine failure, electric shock, fire, and so on.



WARNINGS ABOUT MOVEMENT AND REPAIR

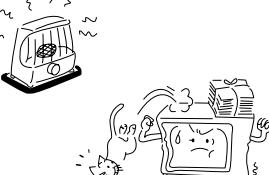
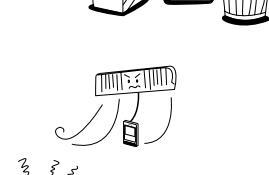
- Do not repair any unit by yourself.
- Whenever the air conditioner needs repair, make sure to ask the dealer to do it. If it is repaired imperfectly, it may cause electric shock or fire.



CAUTION

CAUTIONS ABOUT OPERATION

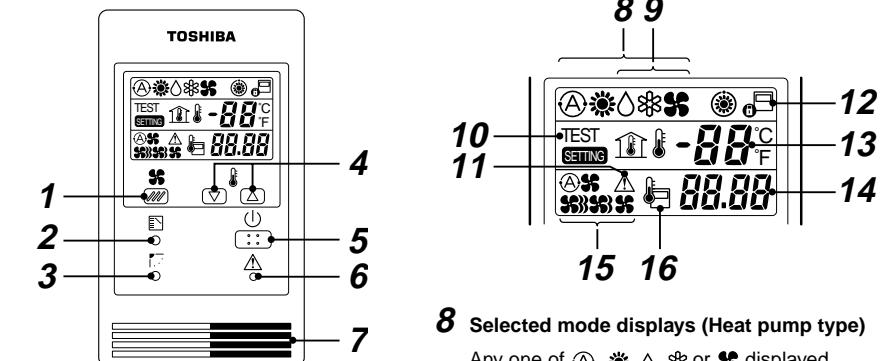
- Carefully read this manual before starting the air conditioner. There are many important things for the safety and the correct usage.
- Do not touch any switches with wet finger, otherwise you may get an electric shock.
- When the air conditioner was not be used for a considerably long time, turn off the main switch or the circuit breaker, for safety. Disconnect from the power supply prevents the unit from lightning and power supply surge.
- Prevent any liquid from falling into the remote controller. Do not spill juice, water or any kind of liquid.



NAME AND OPERATION

- For Cooling Only type, ,  and  are not displayed on LCD.
- Max. 8 indoor units can be operated by a remote controller.
- Once setting the operation items, you can operate the previous condition by pushing  button only.

<The following display is for explanation, so it differs from the real display.>



1 Fan Speed button

2 Operation mode button

3 Swing/Air direction button
The flap angle is changed.

4 Temperature Setup button
Every pushing  button, temperature rises by 1°C.
Every pushing  button, temperature decrease by 1°C.

5  [Start/Stop] button

6 Check button (Used in servicing)
• Do not use this button usually.

7 Remote control temperature sensor
Usually controlled by the indoor unit sensor, it can be changed to the remote controller. For details, contact the shop which you purchased the air conditioner. (When using a group control method, do not use the remote controller sensor.)

- When turning on the power switch of the simple operation type remote controller at the first time,  flashes. While  is displayed, the automatic model check is operating. Operate the remote controller after  has disappeared.

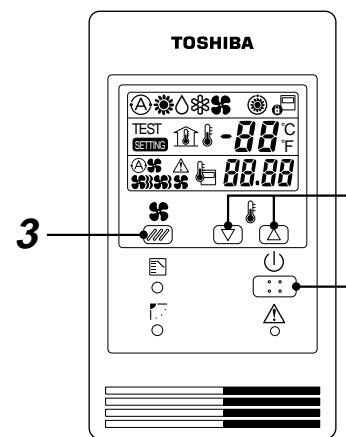
HOW TO OPERATE AIR CONDITIONER

COOL/HEAT AUTO, HEAT, DRY, COOL, FAN

1 Power supply

Turn on the power supply of the air conditioner 12 hours before starting the operation.

2 Push \downarrow button.



3 Push \otimes button (fan) to select fan speed.

When selecting AUTO, fan speed is automatically changed.
(During FAN mode, the air speed is not.)

4 Push either ∇ or Δ set to Auto.

<Recommended temperature>

- During FAN mode, the temperature cannot be set up.

5 Stop

Push \downarrow button.

When stopping the unit by the remote controller, the fan of the outdoor unit, the fan or the outdoor unit may keep operating for a while even if the compressor of the outdoor unit has stopped.

- When the unit cannot be stopped by the remote controller.

Turn off the main power switch or the leakage breaker, and then contact the shop which you purchased the unit.

- In heating, if the room is not enough heated with FAN \otimes , select FAN $\otimes\otimes$ or $\otimes\otimes\otimes$.
- As the temperature sensed by the temp. sensor periphery of the suction port of the indoor unit, it differs from in the room according to the installation state. Set the temperature considering the setup value as the standard temperature in the room.

Automatic Cool/Heat

When all indoor units in the identical refrigerant system are controlled as a group and when all indoor units are installed in the same room, the cooling or heating operation is automatically performed with the difference between the setup temperature and the room temperature.

Accessory parts

Part Name	Q'ty	Part Name	Q'ty
Remote controller (200mm-cable attached)	1	Spacer	2
Screw M4 x 25	2	Wire joint	2
Wood screw	2	Installation Manual	1

Requirement to install the remote controller

Installation place

- Install the remote controller at a position with height 1 to 1.5m from the floor, where the average temperature in the room can be felt.
- Do not install the remote controller at a place exposed to direct sunlight or direct outside air, such as a side of window, etc.
- Do not install the remote controller at a place behind something or rear side of something where air flow is poor in the room.
- Do not install the remote controller in the freezing box or refrigerator because water proof or drop-proof is not applied to this remote controller.
- Be sure to set the remote controller vertically on the wall surface, etc.

How to select the room temperature sensor

The room temperature sensors are equipped in the indoor unit and remote controller.

One of two sensors works. Usually, the room temperature sensor in the indoor unit is set to work. To select the sensor in the remote controller side, refer to the following procedure.

1. Keep **[]**, **[]**, and **[]** buttons pushed for 4 seconds or more.

NOTE) The UNIT No. displayed at the first time is the indoor unit address of the master unit in the group control.

NOTE) Do not push **[]** (select) button.

2. Using the temperature setup buttons **[]**/**[]**, specify ↓ the item code **(0032)**.

3. Using the timer buttons **[]**/**[]**, change the set ↓ data from **(0000)** to **(0001)**.

4. Push **[]** button.

↓ (OK if the display changes from flashing to lighting)

5. Push **[]** button.

The status returns to the normal status. In this time, **[]** is displayed in LCD.

NOTE 1 :

When using two remote controllers, the master remote controller is recognized as **[]** sensor though the temperature can be set from either master or sub remote controller.

NOTE 2 :

In a group control, the **[]** sensor does not work if the group address is not set to the indoor unit of the master unit.

NOTE 3 :

When using the remote sensor together with the remote controller, do not use the **[]** sensor of the remote controller.

How to install remote controller

NOTE 1 : Avoid to twist the remote controller cable with power supply cable, etc. or to store them in the same metal pipe, otherwise it causes a malfunction.

NOTE 2 : Install the remote controller apart from the generation source of noise.

NOTE 3 : When noise is contained to the unit power supply, counter measures such as mounting the noise filter is necessary.

- When using the remote controller as exposed, install it at the wall surface where it can be fixed.

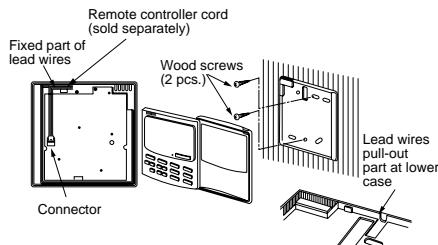


Fig. A

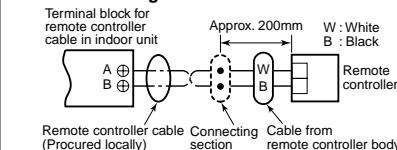
- For removal and mounting of the remote controller body and the rear case, refer to the item, "Using as concealed type".
- Remove the lead wires wound to the fixing part of lead wires of the remote controller body, remove the connectors, and then connect the remote controller cable (sold separately) to the connector section of the remote controller body. Insert the remote controller cable into the groove and form it, and wind it around the fixing part of lead wires.
- Notching the lower case (thin part of the upper center part) with nipper, etc., pull out the remote controller cables from this part. (Fig. A) (Refer to the item, "How to perform cabling of the remote controller".)
- Fix the remote controller body by two wood screws.
- Using the cable clips (Accessory of remote controller cable sold separately), fix the remote controller cable to the wall surface.

Remote controller test run setup

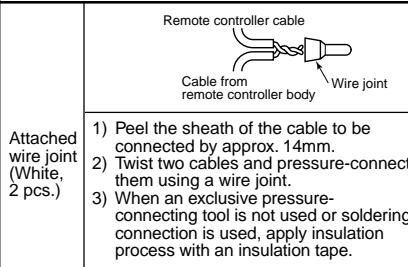
- When the remote controller is used at the first time, it accepts an operation approx. 5 minutes after the power supply has been turned on. It is not a trouble, but is because the setup of the remote controller is being checked.
- Push **[]** key after [TEST] has been displayed on LCD by keeping **[]** button on the remote controller for 4 seconds or more.
 - During the test run, [TEST] is displayed on LCD.
 - The temperature cannot be controlled if [TEST] is displayed.
- Do not use [TEST] in a case other than a test run, otherwise an excessive load is applied on the machine.
- Use [TEST] in one of HEAT, COOL, and FAN operation modes.
- NOTE** : The outdoor unit does not operate for approx. 3 minutes after the power supply has been turned on or the operation has stopped.
- After the test run has finished, push **[]** button again to check [TEST] on LCD has gone off. (For this remote controller, a release function of 60 minutes timer is provided to prevent continuous test runs.)

How to perform cabling of the remote controller

Connection diagram

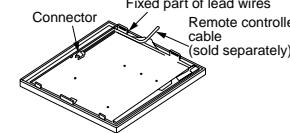


- Non polarity, 2 core cable is used.
- Use 0.5mm² to 2mm² cable.



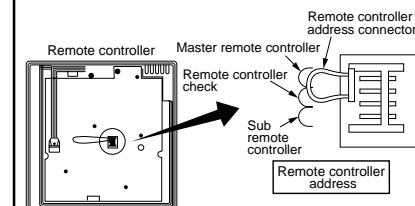
- Peel the sheath of the cable to be connected by approx. 14mm.
- Twist two cables and pressure-connect them using a wire joint.
- When an exclusive pressure-connecting tool is not used or soldering connection is used, apply insulation process with an insulation tape.
- For cabling of the remote controller, use the remote controller cable (sold separately).

- Remove the lead wires wound to the fixing part of lead wires of the remote controller body, remove the connectors, and then connect the remote controller cable (sold separately) to the connector section of the remote controller body. Insert the remote controller cable (sold separately) into the groove and form it, and wind it around the fixing part of lead wires.
- When using the remote controller cable (sold separately), refer to the Installation Manual attached to the remote controller cable.



Requirement for installation of multiple remote controllers

"2 remote controllers" means that one or multiple units are operated by the multiple remote controllers. (Max. 2 remote controllers can be set.)



How to install

For 2 remote controllers, install the remote controllers in the following procedure.

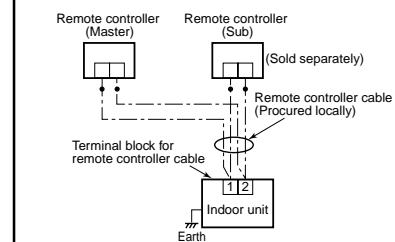
- Set one of two remote controllers as the master remote controller. (At shipment from factory)
- For the other remote controller, exchange the remote controller address connector of the master to sub remote controller on the P.C. board. Under this condition, the other remote controller functions as the sub controller.

Basic wiring diagram

NOTE :

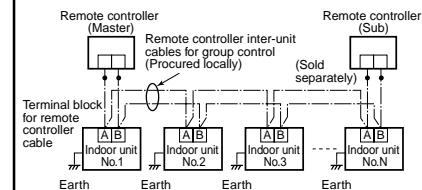
Connect cables without miswiring. (Miswiring breaks the unit.)

- In a case to operate an indoor unit from the remote controllers at two positions



- In a case to operate a group control of multiple indoor units from the remote controllers at two positions

*Master and Sub remote controllers are operable even if they are installed to any indoor unit.



Accessory parts

Part Name	Q'ty	Part Name	Q'ty
Remote controller (200mm-cable attached)	1	Spacer	2
Screw M4 x 25	2	Wire joint	2
Wood screw	2	Clamper	1
		Installation Manual	1

Requirement to install the remote controller

Installation place

- Install the remote controller at a position within 1 to 1.5m from the floor, where the average temperature in the room can be felt.
- Do not install the remote controller at a place exposed to direct sunlight or direct outside air, such as a side of window, etc.
- Do not install the remote controller at a place behind something or rear side of something, where air flow is poor in the room.
- Do not install the remote controller in the freezing box or refrigerator because water proof or drop-proof is not applied to this remote controller.
- Be sure to set the remote controller vertically on the wall surface, etc.

How to select the room temp. sensor

The room temperature sensors are equipped in the indoor unit and the remote controller.

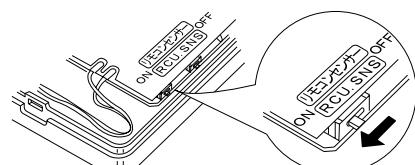
One of two sensors works. Usually, the room temperature sensor in the indoor unit is set to work. To select the sensor in the remote controller, turn the remote controller sensor from OFF to ON.

NOTE 1 :

Selecting the sensor in the remote controller is impossible on the sub remote controller.

NOTE 2 :

Do not select the sensor in the remote controller when a remote controller sensor is used.
(Because it causes a straying.)



How to install the remote controller switch

NOTE 1 :

Avoid to twist the remote controller cable with the power supply cable, etc. or to store them in the same metal pipe, otherwise it causes a malfunction.

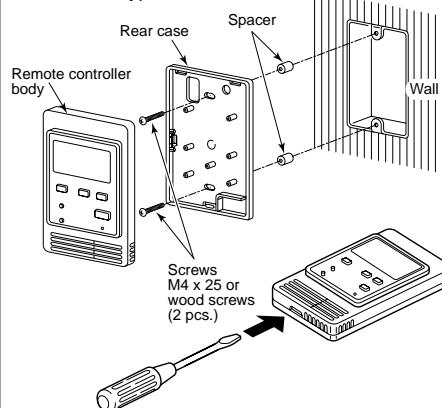
NOTE 2 :

Install the remote controller apart from the generation source of noise.

NOTE 3 :

When noise is contained to the power source of the indoor unit, counter measures such as mounting the noise filter is necessary.

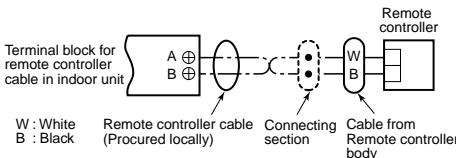
- In case of using the remote controller as a concealed type



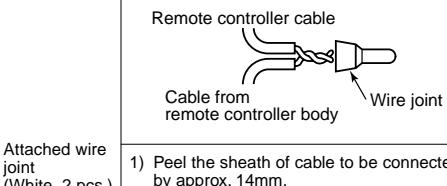
- Inserting a minus screwdriver, etc. into the groove at the lower side of the remote controller body, force open the rear case to remove it.
- Using the attached M4 screws (2 pcs.), fix the rear case of the remote controller.
Before installation, press to open the screw hole with a screwdriver, etc.
- Fix it with the spacer, but not so strongly. If the remote controller does not fit closely to the wall, adjust it by cutting off the spacer.
- Connect the remote controller cable (2 cores) to the cable from the remote controller body.
Connect the remote controller cable without miswiring upon confirmation of the terminal numbers of the indoor unit. (If applied AC 220/230/240V, may damage the unit.)
- Install the remote controller body to hooks on the rear case and putting into the hooks.

How to perform cabling of the remote controller

• Connection diagram



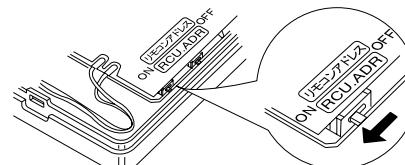
- Non polarity, 2 core cable is used.
- Use 0.5mm² to 2 mm² cable.



- Peel the sheath of cable to be connected by approx. 14mm.
- Twist two cables and pressure-connect them using a wire joint.
- When an exclusive pressure-connecting tool is not used or soldering connection is used, apply insulation process with an insulation tape.

Requirement for installation of multiple remote controllers

"2 remote controller control" means that one or multiple units are operated by the multiple remote controllers.



• How to install

For 2 remote controller control, install the remote controllers in the following procedure.

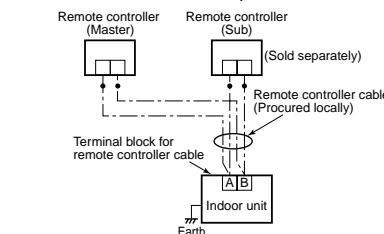
- Set one of the set multiple remote controllers to the master remote controller.
(At shipment from factory)
- For other remote controllers, turn the remote controller address switch on the remote controller P.C. board from OFF to ON. They function as sub remote controllers under the above condition.

• Basic cabling diagram

NOTE :

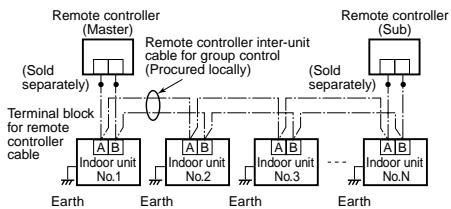
Connect cables without miswiring.
(Miswiring breaks the unit.)

- In a case to operate an indoor unit from the remote controllers at two positions



- In a case to operate a group control of multiple indoor units from the remote controllers at two positions

* Master and sub remote controllers are operable even if they are installed to any indoor unit.



Remote controller test run setup

- Push (U) key after keeping [CHECK] button pushed on the remote controller for 4 seconds or more.

• During the test run, "TEST" is displayed on LCD.

• The temperature cannot be controlled if [TEST] is displayed. Do not use [TEST] in a case other than a test run, otherwise an excessive load is applied on the machine.

- Use [TEST] in one of HEAT, COOL, and FAN operation modes.

NOTE :

The outdoor unit does not operate for approx. 3 minutes after the power supply has been turned on or the operation has stopped.

- After the test run has finished, push [CHECK] button again to check "TEST" on LCD has gone off. (For this remote controller, a release function of 60 minutes timer is provided to prevent consecutive test runs.)

TOSHIBA INSTALLATION MANUAL To Personnel Charged in Installation (Electric) Work and Service

Program Weekly Timer
MODEL : RBC-EXW21E

Accessory parts

Part Name	Q'ty
Program weekly timer	1
Connecting cable (Length: 1.2m)	1
Screws M4 x 25	2
Wood screws	2
Spacer	2
Owner's Manual	1
Installation Manual	1

Requirement to install the program weekly timer

Installing dimension for serial installation

When installing the program weekly timer (remote controller/system controller, etc.) to the wall surface, follow the installation procedure in (Fig. 1) and (Fig. 2).

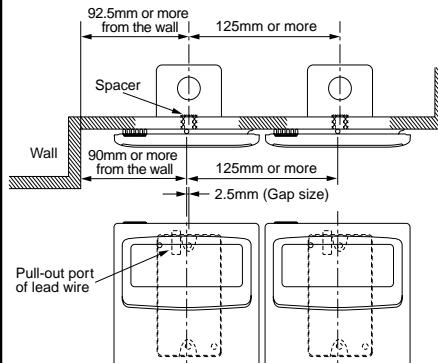


Fig. 1

*When installing the remote controller and the program weekly timer which are set in parallel at upper side and lower side, in consideration of maintenance, keep a clearance with 25mm or more.

How to install the program weekly timer

NOTE 1 :

Avoid to twist the program weekly timer cable with the power supply cable, etc. or to store them in the same metal pipe, otherwise it causes a malfunction.

NOTE 2 :

Install the program weekly timer apart from the generation source of noise.

NOTE 3 :

When noise is induced to the power source of the indoor unit, measures such as mounting the noise filter is necessary.

- Install the program weekly timer to the box (Procured locally) which has previously inserted in the wall.

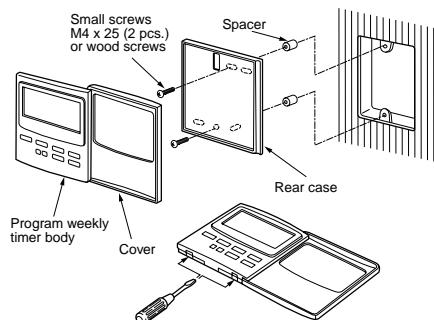
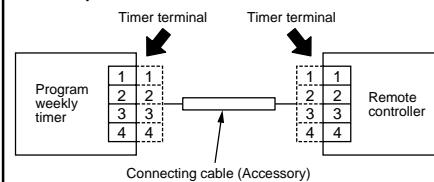


Fig. 2

1. Inserting a minus screwdriver, etc. into the groove at the lower side of the program weekly timer, which appears when opening lid of the program weekly timer body, force open the rear case to remove it.
2. Using the attached M4 screws or wood screws (2 pcs.), fix the rear case of the program weekly timer. Before installation, press to open the screw hole with a screwdriver, etc. Fix it with the spacer, but not so strongly. If the program weekly timer does not fit closely to the wall, adjust it by cutting off the spacer.
3. Connect the attached connecting cable (4 cores) to the program weekly timer body.
4. Install the program weekly timer body by matching to hooks on the rear case and putting into the hooks.

Cabling

• Connection diagram (Be sure to use the attached connecting cable.)



• Arrangement

The program weekly timer and the remote controller can be arranged to either right or left side.

• Cabling procedure

Perform cabling in the following procedure.

1. Connect the attached connecting cable to the timer terminal (4P connector) of the program weekly timer. (Fig. 3)

<Remote controller> <Program weekly timer>

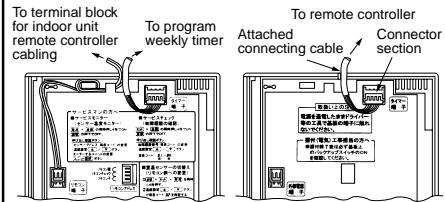
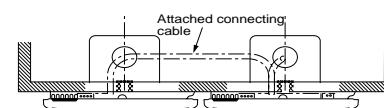


Fig. 3

2. Pull the attached cable out of lead wire pull-out port on the rear case of the program weekly timer and connect the cable to the timer terminal (4P connector) of the remote controller via inside of the wall. (Fig. 4)



<Program weekly timer> <Remote controller>

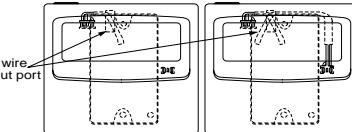
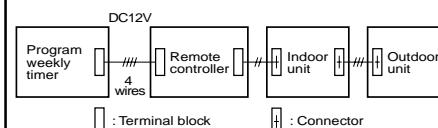


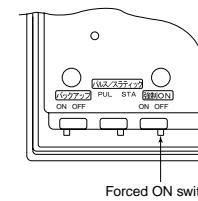
Fig. 4

• System diagram



Program weekly timer test run setup

- After installation, check (OFF to ON) output status using the forced ON switch on the rear side of the program weekly timer P.C. board. Then check the normal operation and **certainly turn OFF the forced ON switch**.

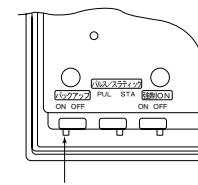


Memory backup function for power failure compensation

- This program weekly timer stores in memory the contents set by the operation button during a power failure. Pushing (PROGRAM) button resumes the operation with the contents before the power failure when the power failure has been reset.

• How to use [BACKUP]

After the installation work, check [BACKUP] switch on the rear side of the program weekly timer P.C. board is turned to ON side.



Explanation to customers

- After the installation work, hand "Owner's Manual" and "Installation Manual" to the customers.
- Explain use and maintenance methods to the customers according to "Owner's Manual".

TOSHIBA INSTALLATION MANUAL

To Personnel Charged in Installation (Electric) Work and Service

Remote sensor
MODEL : TCB-TC21LE

Accessory parts

Part Name	Q'ty	Part Name	Q'ty
Remote sensor (200mm-cable attached)	1	Spacer	2
Small screw M4 x 25	2	Wire joint	2
Wood screw	2	Cable clamp	1
		Installation Manual	1

Requirement to install the remote sensor

Installation place

- Install the remote sensor at a position with height 1 to 1.5m from the floor, where the average temperature in the room can be felt.
- Do not install the remote sensor at a place exposed to the direct sunlight or direct outside air, such as a side of window, etc.
- Do not install the remote sensor at a place behind something or rear side of something, where air flow is poor in the room.
- Do not install the remote controller near the freezing box or refrigerator because water proof or drop-proof is not applied to this remote controller.
- Be sure to set the remote sensor vertically on the wall surface, etc.

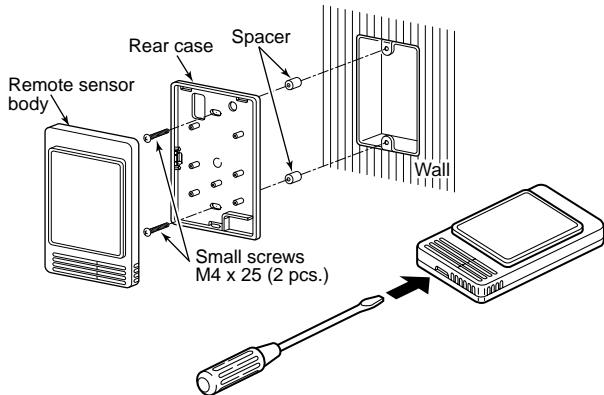
How to install the remote sensor

NOTE 1 : Avoid to twist the remote sensor cable with the power supply cable, etc. or to store them in the same metal pipe, otherwise it causes a malfunction.

NOTE 2 : Install the remote sensor apart from the generation source of noise.

NOTE 3 : When noise is induced to the power source of the indoor unit, some measures such as mounting the noise filter is necessary.

- In case of using the remote sensor as a concealed type



- Inserting a minus screwdriver, etc. into the groove at the lower side of the remote sensor body, force open the rear case to remove it.
- Using the attached M4 screws (2 pcs.), fix the rear case of the remote sensor. Before installation, press to open the screw hole with a screwdriver, etc.

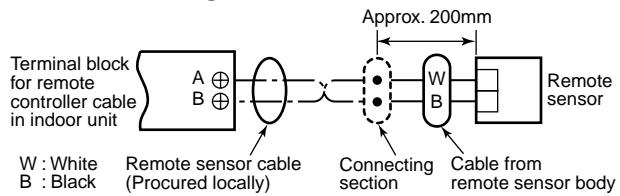
Fix it with the spacer, but not so strongly. If the remote sensor does not fit closely to the wall, adjust it by cutting off the spacer.

- Connect the remote sensor cable (2 cores) to the terminal numbers of the indoor unit.
(Applying AC 220/230/240V breaks the unit.)
- Install the remote sensor body by matching to hooks on the rear case and putting into the hooks.

How to perform cabling of the remote sensor

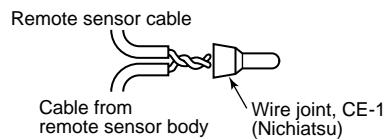
In case of using the remote sensor as a concealed type

• Connection diagram



- Non polarity, 2 core cable is used..
- Use 0.5mm² to 2 mm² cable.

Attached wire joint
(White, 2 pcs.)



- Peel the sheath of the cable to be connected by approx. 14mm.
- Twist two cables and pressure-connect them using a wire joint.
- When an exclusive pressure-connecting tool is not used or soldering connection is used, apply insulation process with an insulation tape.

Requirement for using the remote sensor together with the remote controller

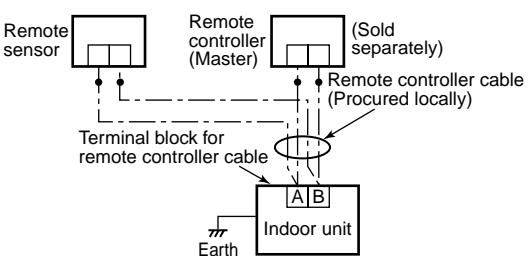
• How to install

For the above control, install the remote sensor in the following procedure.

- Set the remote controller as the master remote controller.
- Do not change the remote sensor switch in the master remote controller for correct temperature control by remote sensor.

• Basic cabling diagram

- Connect cables without miswiring.
(Miswiring breaks the unit.)
- In a case to operate an indoor unit from the remote sensors and the remote controller.



Installation Manual

Model: TCB-FPC11BE
TCB-FPC21BE
TCB-FPC31BE
TCB-FPC41BE

NOTES

- Do not unpack the filter until you use it.
(Otherwise, life of the Zeolite-3G deodorant filter is shortened.)
- Keep this Manual with Owner's Manual of the indoor unit.

Safety Cautions

- Before installation work, read thoroughly this "Safety Cautions" to install the air conditioner correctly.
- This "Safety Cautions" describes the important contents concerned to the safety. Be sure to keep in mind these items. Symbols and meanings are as described below.

 WARNING	Indicates "User may be dead or seriously injured (*1) if it is incorrectly used."
 CAUTION	Indicates "It is assumed that user may be injured (*2) or property damage (*3) may occur if it is incorrectly used."

*1: "Serious injury" means a disease which has an after-effect or requires hospitalization or long-term going to the hospital for treatment, such as loss of sight, burn (by high temperature or low temperature), electric shock, fracture, poisoning, etc.

*2: "Injury" means hurt, burn, electric shock, etc. which does not require hospitalization or long-term going to the hospital for treatment.

*3: "Property damage" means enlarged damage concerned to house, household effects, domestic animal, pet, etc.

Explanation of picture symbols

	○ indicates prohibition (prohibited action). The concrete prohibited action is indicated with picture or sentence in or near the picture symbol.
	● indicates that the forced instructed action (Act necessarily). The concrete instructed action is indicated with picture or sentence in or near the picture symbol.
	△ indicates an item with care. The concrete item to be cautioned is indicated with picture or sentence in or near the picture symbol.

WARNING

- Do not put a plastic bag including filter on a place where hands of a small child can reach.
If the child puts the bag on his head, it may seal his mouth or nose resulting in choke of death.



CAUTION

- Install the suction grille surely to the main unit.
If an incomplete installation is performed, falling of the suction grille causes an injury.



Specifications

Deodorant filter	Model	TCB-FPC11BE	TCB-FPC21BE	TCB-FPC31BE	TCB-FPC41BE
Conformed air conditioner model name	—	561BT	801BT	1101 to 1401BT	
Quantity	1	1	2	2	
Initial deodorant performance		70%			
Deodorant durable performance		Approx. 12 months			

Installation of filter sold separately

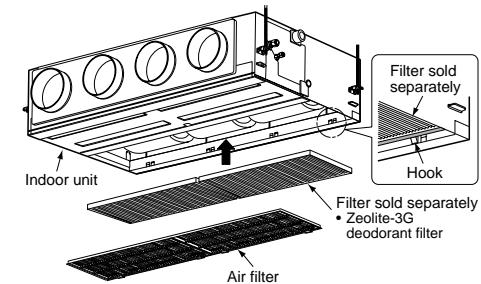
1 Remove the air filter, and install a filter sold separately to the suction port.

Push the filter sold separately completely up to the end.

Check that the rear side is hanged to the hook.

2 Install the air filter

Be sure to fix the air filter with clamps in order to prevent falling.
(Clamps are attached to the indoor unit.)



Maintenance of filter sold separately

• Clean the filter sold separately once per 6 months.

1 Take out the filter sold separately in the reverse order of "Installation of filter sold separately".

2 Cleaning of the filter sold separately

Sweep away the dust of the filter sold separately by hitting lightly and dry it in the sunlight for 6 hours or more.

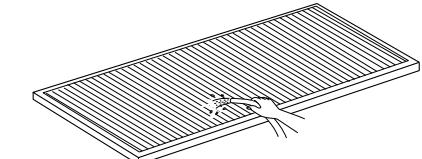
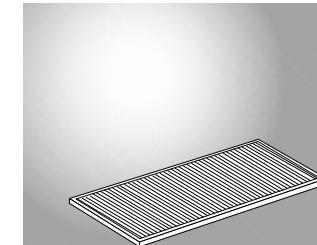
In case of wash the filter sold separately with water

Put the filter sold separately horizontally on a place where is exposed to the sunlight, and then wash it with running water such as shower.

After then, leave it as it is until it will dry. In this time, also dry it in the sunlight for 6 hours or more.

3 Install the air filter.

Based upon "Installation of filter sold separately", install the filter.



NOTE

If treating the filter as it gets wet, it may be damaged.

Concealed Duct type

High-Efficiency Filter

High-Efficiency filter (65%)

Installation Manual

Model: TCB-UFM11BE
TCB-UFM21BE
TCB-UFM31BE
TCB-UFM41BE

High-Efficiency filter (90%)

Model: TCB-UHF51BE
TCB-UHF61BE
TCB-UHF71BE
TCB-UHF81BE

Safety Cautions

- Before installation work, read thoroughly this "Safety Cautions" to install the air conditioner correctly.
- This "Safety Cautions" describes the important contents concerned to the safety. Be sure to keep in mind these items. Symbols and meanings are as described below.

WARNING	Indicates "User may be dead or seriously injured (*1) if it is incorrectly used."
CAUTION	Indicates "It is assumed that user may be injured (*2) or property damage (*3) may occur if it is incorrectly used."

*1: "Serious injury" means a disease which has an after-effect or requires hospitalization or long-term going to the hospital for treatment, such as loss of sight, burn (by high temperature or low temperature), electric shock, fracture, poisoning, etc.

*2: "Injury" means hurt, burn, electric shock, etc. which does not require hospitalization or long-term going to the hospital for treatment.

*3: "Property damage" means enlarged damage concerned to house, household effects, domestic animal, pet, etc.

Explanation of picture symbols

	○ indicates prohibition (prohibited action). The concrete prohibited action is indicated with picture or sentence in or near the picture symbol.
	! indicates that the forced instructed action (Act necessarily). The concrete instructed action is indicated with picture or sentence in or near the picture symbol.
	△ indicates an item with care. The concrete item to be cautioned is indicated with picture or sentence in or near the picture symbol.

WARNING

- Do not put a plastic bag including filter on a place where hands of a small child can reach.
If the child puts the bag on his head, it may seal his mouth or nose resulting in choke of death.



CAUTION

- Install the suction grille surely to the main unit.
If an incomplete installation is performed, falling of the suction grille causes an injury.



Specifications

High-efficiency filter (65%) model name	TCB-UFM11BE	TCB-UFM21BE	TCB-UFM31BE	TCB-UFM41BE	High-efficiency filter (90%) model name	TCB-UHF51BE	TCB-UHF61BE	TCB-UHF71BE	TCB-UHF81BE
Conformed air conditioner model name	—	561BT	801BT	1101BT to 1401BT	Conformed air conditioner model name	—	561BT	801BT	1101BT to 1401BT
Quantity	1	1	2	2	Quantity	1	1	2	2
Dust collecting effect	Color test 65%			Dust collecting effect	Color test 90%				
Operation time	2500 hours			Operation time	1800 hours				

Installation of high-efficiency filter

- Remove the air filter, and install high-efficiency filter to the suction port.

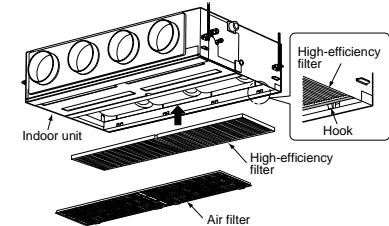
Push the high-efficiency filter completely up to the end.
Check that the rear side is hanged to the hook.

- Install the air filter

Be sure to fix the air filter with clamps in order to prevent falling.
(Clamps are attached to the indoor unit.)

NOTE

These filter cannot be reused even if it is washed.



Setup of fan when building in the high-efficiency filter:

Necessary at initial installation only

Two methods are provided for setup, one is to use a wired remote controller sold separately and the other is to exchange the short plug on the indoor microcomputer P.C. board.

[Using a wired remote controller sold separately]

(Procedure) Perform the setup while the equipment stops.

- Push **SET** + **CL** + **RIGHT** buttons concurrently for 4 seconds or more.
The firstly displayed unit No. is the master indoor unit address of the group control.
In this time, the fan of the selected indoor unit only operates.

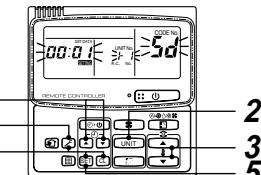
- Every pushing **UNIT** button, No. of the group control units are displayed in order.
In this time, the fan of the selected indoor unit only operates.

- Using set temperature **▲** and **▼** buttons, specify the item code "5d".

- Using timer **▲** and **▼** buttons, select from the set data.
For contents of the setup data, refer to the table at the right.

- Push **SET** button.
(When flashing display changes to lighting display, the setup completes.)

- Pushing **RIGHT** button returns the state to the normal stop state.



* Setup can be performed only by the wired remote controller. If setup is not performed, air volume is decreased and deicing occurs.

• Item code 5d

Set data	Filter sold separately
0000	Standard filter (At shipment)
0001	High-efficiency filter (65%) (TCB-UFM11BE to UFM41BE) High-efficiency filter (90%) (TCB-UHF51BE to UHF81BE)

[Exchange of short plug on indoor microcomputer P.C. board]

To exchange the static pressure, there is a method other than the abovementioned method by wired remote controller, which is to shift the short plug on the indoor microcomputer P.C. board as shown in the following table. Adopt this method in case of using a wireless remote controller, etc.

* However, after exchanging once, be careful to shift the short plug to the standard position (At shipment) in order to return to the standard setup (follow to E2PROM setup) though the setup for high static-pressure 1, high static-pressure 2, or low static-pressure can be arbitrarily performed. It is necessary to rewrite data from the wired remote controller sold separately in the set data "0000".

- Select with shifting of the short plug on the indoor unit microcomputer P.C. board.

Short plug position (CN112, CN111, CN110 from the left)



*1 Resistance of high-efficiency filter 65 and 90, deodorant filter, or ammonium filter is equivalent to 30Pa. Therefore, set the resistance (external static pressure) of a duct to be connected to 40Pa.

Short plug position	External static pressure	Filter sold separately
Short	40Pa	Standard filter (At shipment)
Open	Standard (At shipment)	Zeolite-3G deodorant filter
CN112 CN111 CN110	70Pa	High static-pressure 1 High static-pressure 2 Deodorant filter Ammonium filter
H H H	100Pa	—
CN112 CN111 CN110	20Pa	Low static-pressure
H H H	—	—
CN112 CN111 CN110	—	—
H H H	—	—

TOSHIBA

Concealed Duct type

Deodorant Filter, Ammonium Filter Installation Manual

Deodorant Filter

Model: TCB-DF11BE

TCB-DF21BE

TCB-DF31BE

TCB-DF41BE

Ammonium Filter

Model: TCB-DF11BE-AM

TCB-DF21BE-AM

TCB-DF31BE-AM

TCB-DF41BE-AM

Safety Cautions

- Before installation work, read thoroughly this "Safety Cautions" to install the air conditioner correctly.
- This "Safety Cautions" describes the important contents concerned to the safety. Be sure to keep in mind these items. Symbols and meanings are as described below.

WARNING	Indicates "User may be dead or seriously injured (*1) if it is incorrectly used."
CAUTION	Indicates "It is assumed that user may be injured (*2) or property damage (*3) may occur if it is incorrectly used."

*1: "Serious injury" means a disease which has an after-effect or requires hospitalization or long-term going to the hospital for treatment, such as loss of sight, burn (by high temperature or low temperature), electric shock, fracture, poisoning, etc.

*2: "Injury" means hurt, burn, electric shock, etc. which does not require hospitalization or long-term going to the hospital for treatment.

*3: "Property damage" means enlarged damage concerned to house, household effects, domestic animal, pet, etc.

Explanation of picture symbols

	indicates prohibition (prohibited action). The concrete prohibited action is indicated with picture or sentence in or near the picture symbol.
	indicates that the forced instructed action (Act necessarily). The concrete instructed action is indicated with picture or sentence in or near the picture symbol.
	indicates an item with care. The concrete item to be cautioned is indicated with picture or sentence in or near the picture symbol.

WARNING

- Do not put a plastic bag including filter on a place where hands of a small child can reach.
If the child puts the bag on his head, it may seal his mouth or nose resulting in choke of death.



CAUTION

- Install the suction grille surely to the main unit.
If an incomplete installation is performed, falling of the suction grille causes an injury.



Specifications

Deodorant filter model name	TCB-DF11BE	TCB-DF21BE	TCB-DF31BE	TCB-DF41BE	Ammonium filter model name	TCB-UFH11BE-AM	TCB-UFH21BE-AM	TCB-UFH31BE-AM	TCB-UFH41BE-AM
Conformed air conditioner model name	—	561BT	801BT	1101BT to 1401BT	Conformed air conditioner model name	—	561BT	801BT	1101BT to 1401BT
Quantity	1	1	2	2	Quantity	1	1	2	2
Initial deodorant performance	85%			Initial deodorant performance	95%				
Deodorant durable performance	Approx. 9 months			Deodorant durable performance	Approx. 15 months				

Installation of filter sold separately

- Remove the air filter, and install a filter sold separately to the suction port.

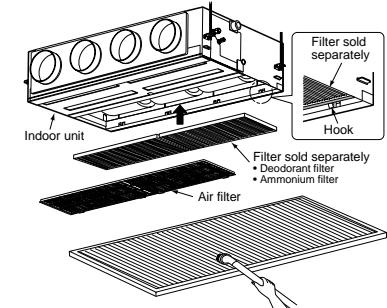
Push the filter sold separately completely up to the end.
Check that the rear side is hanged to the hook.

- Install the air filter

Be sure to fix the air filter with clamps in order to prevent falling.
(Clamps are attached to the indoor unit.)

NOTE

These filter cannot be reused even if it is washed.



To install a filter sold separately, be sure to set the fan referring the following description.

* The filter sold separately cannot be installed to an air conditioner built in with auxiliary electric heater.

Maintenance of filter sold separately

- Clean the filter sold separately once per 2 months.

- Take out the filter sold separately in the reverse order of "Installation of filter sold separately".

- Sweep away the dust of the filter sold separately with a cleaner.

- Install the filter sold separately.

Setup of fan when building in the filter sold separately:

Necessary at initial installation only

Two methods are provided for setup, one is to use a wired remote controller sold separately and the other is to exchange the short plug on the indoor microcomputer P.C. board.

[Using a wired remote controller sold separately]

(Procedure) Perform the setup while the equipment stops.

- Push **SET** + **CL** + **□** buttons concurrently for 4 seconds or more.
The firstly displayed unit No. is the master indoor unit address of the group control. In this time, the fan of the selected indoor unit only operates.

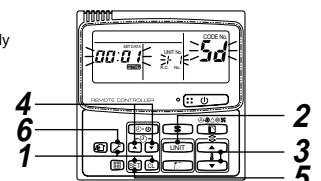
- Every pushing **UNIT** button, No. of the group control units are displayed in order.
In this time, the fan of the selected indoor unit only operates.

- Using set temperature **▲** and **▼** buttons, specify the item code "5d".

- Using timer time **▲** and **▼** buttons, select from the set data.
For contents of the setup data, refer to the table at the right.

- Push **SET** button.
(When flashing display changes to lighting display, the setup completes.)

- Pushing **□** button returns the state to the normal stop state.



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